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Multipore—A Thin Perforate Latex Sheet

G. E. Shriver and H. F. Jordan[1]

CHARLES GOODYEAR, who perhaps anticipated more fully the versatility of rubber than anyone since his time, suggested in his treatise on rubber[2] that perforated rubber might be used for "sieves, colanders and strainers" and that it might "also be substituted in a great many cases, if not generally, for woven wire cloth." With the need for products of this type intensifying in recent years, much research has been done toward improving the processes and products related to this field. Two recently developed porous sheet rubber products are Multipore[3] and microporous hard rubber.[3] Both have extensive application as aids to filtration, and each has other potential uses peculiar to itself. The present article will be devoted to a discussion of Multipore, and microporous hard rubber will be treated in a succeeding article.

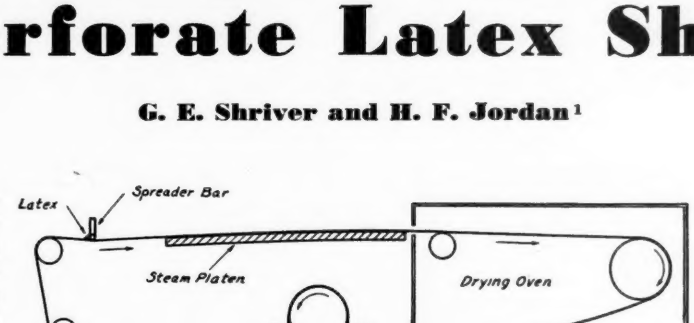


Fig. 1. Sketch of Spreader Showing Essential Features of Process for Manufacturing Multipore

Multipore[4] is a porous rubber sheet made from latex rubber deriving its porous characteristics from many minute and uniformly spaced holes that extend perpendicularly through the sheet. The types now produced commercially have 1,100 to 6,400 holes per square inch and pore diameters of 0.012 to 0.004-inch, depending upon the type. At present Multipore can be obtained in soft rubber, hard rubber, flexible hard rubber, and soft Neoprene.

Comparison with Mechanically Perforated Sheeting

While to the casual observer Multipore resembles a perforated sheet with an unusually large number of exceedingly fine holes, Multipore is not and should not be considered in the same class with mechanically perforated sheeting. The holes in Multipore are not punched, but are formed by the expansion of air through a film of liquid rubber latex. As a result of the unique features of the process[5] by which Multipore is manufactured, a porous sheeting is now available which has many advantages over mechanically perforated material, including: (1) smaller holes; (2) more holes per unit area (punched sheeting is rarely made with more than 500 holes per square inch; whereas Multipore can be made with as many as 6,400 holes per square inch); (3) greater mechanical strength (this increased strength is the combined result of using latex, of the elimination of cuts produced by the ordinary punching operation, and of the natural reenforcement of the holes imparted by the Multipore process); and (4) production of holes before vulcanization (this permits variation in the shape and porous characteristics through stretching and other operations before vulcanization).

Process

The master form on which Multipore is made consists of a heavy fabric belt surfaced on one side with a layer of rubber and is known as a Multipore blanket. The rubber surface appears to be full of small round holes

[1] Research chemists, General Laboratories, United States Rubber Co., Passaic, N. J.
[2] "Gum Elastic," Vol. 1, p. 201 (1855).
[3] Product of United States Rubber Co., Mechanical Division, 1790 Broadway, New York, N. Y.
[4] U. S. patent No. 2,032,941.
[5] U. S. patent No. 2,032,942.

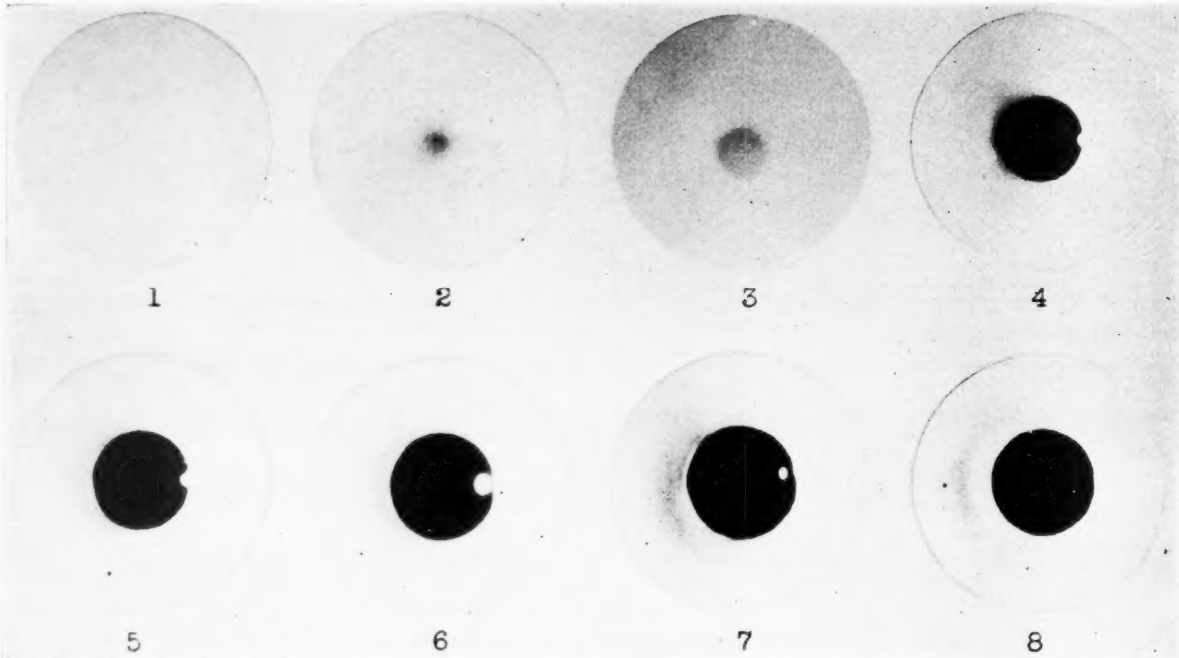


Fig. 2. Microphotographs (48 Magnifications) of Stages in Blowing of Multipore: 1, Wet Latex Film Immediately After Spreading; 2 to 6, Growth of the Pore Caused by the Entrapped Air Expanding as It Is Heated; 7, Film Drying Out with the Bubble about to Break; 8, Bubble Has Broken and the Latex Is "Set"

uniformly spaced. Actually these holes are pits approximately 0.020-inch deep and closed at the bottom. The number of pits per unit area and the diameter of the pits at the surface of the blanket determine the porous characteristics of the Multipore made on it and are subject to control in regard to both size and number per unit area.

For commercial production of Multipore the master blanket is placed, with the pitted surface up, as an endless belt on a modified conventional spreading machine. An elevation sketch of the equipment used in the process is shown in Figure 1. A thin layer of liquid rubber latex is applied to the moving belt by a spreader bar. The latex completely covers all the pits in the blanket surface, but does not run down into them. Thus air is trapped in each little pit. Heat is then applied to the under surface of the blanket by a steam platen, and as the belt becomes hot, the air in the pits expands, blowing little bubbles in the film of latex. When the bubbles burst, small holes are left in the film of rubber corresponding in size and number to the pits in the blanket surface. This is illustrated in Figure 2 by microphotographs of the blowing process taken with a moving picture camera, which show the development of the bubbles by air expanding in the pits beneath.

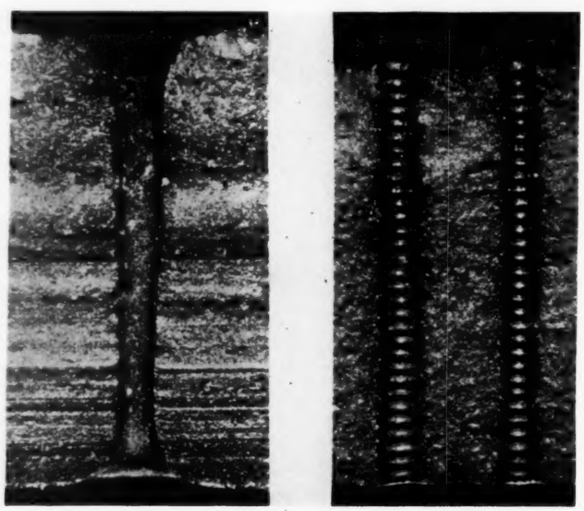


Fig. 3. Cross-Sectional View of Holes (Magnified 31 Diameters): *Left*, Punched Sheet; *Right*, Multipore

The blown rubber film is then thoroughly dried in the drying chamber; the belt is cooled to room temperature on a cooling drum, and the process is repeated as many times as are required to obtain the desired thickness. In this manner a sheet of Multipore can be made to any thickness between 0.005- and 0.100-inch, to a tolerance of a few thousandths of an inch.

The sheet of Multipore, having holes that extend all the way through, is then stripped off the master blanket and vulcanized. Between 95 and 100% of the holes in the Multipore blanket are reproduced in the Multipore sheet. As would be expected from a consideration of the process, the perforations in Multipore are not truly cylindrical in shape, but are reenforced internally by slight constrictions which contribute to strength and tear resistance. The shapes of the pores obtained by the Multipore process and by mechanical perforation, respectively, are illustrated by the microphotographs in Figure 3.

Types of Multipore

There are two general types of Multipore, plain and expanded. As indicated below, each type gives promise of adaptability for a wide variety of products.

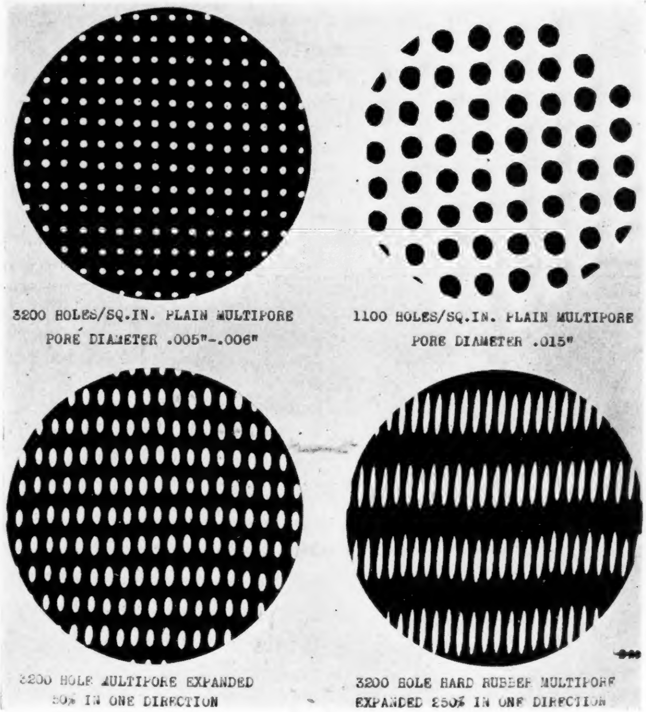


Fig. 4. Microphotographs of Types of Multipore (7½ Magnifications)

Plain Multipore

If after stripping, the Multipore sheet is vulcanized without any further processing, the product is classified as plain Multipore. In this form the holes are round and extend perpendicularly through the sheet. Plain Multipore can also be made with a fabric backing firmly adhered to one or both sides with very little loss in porosity. A wide variety of fabrics can be used, and by a suitable choice the stretchable characteristics of the rubber-fabric combination may be controlled. Plain Multipore can be obtained in soft rubber, hard rubber, flexible hard rubber, and soft Neoprene. Microphotographs of two types of plain Multipore are shown in Figure 4. Table 1 summarizes the porous characteristics and maximum dimensions of the standard types of plain Multipore now commercially available.

TABLE 1

No. Holes per Sq. In.	Ave. Hole Diameter—Inch	Calc. % Voids	Standard Available Thicknesses* Inch	Max. Width of Sheet† Inches	Max. Length of Sheet† Yards
6,400	.004-.005	8-10	.030	42	38
3,200	.005-.006	6-7	.030, .050 / .070, .090	42	38
1,700	.005-.007	5-6	.030, .050 / .070, .090	42	38
1,100	.010-.012	10.13	.030, .050 / .070, .090	42	38

*Other thicknesses can be produced to specification.
†Finished sheets can be joined.

Expanded Multipore

If unvulcanized Multipore is first stretched in either one or two directions and vulcanized under stretch, the product is known as expanded Multipore.[6] Depending on the degree and type of stretch, a wide variety of products of the expanded type can be made which are usually characterized by oval holes and higher porosity than plain Multipore. In some cases porosities as high as 30% can be obtained. At present the expanded types can be made in soft rubber, hard rubber, and flexible hard rubber. Microphotographs of two types of expanded Multipore are also shown in Figure 4.

[6] U. S. patent No. 2,079,584.

Applications

As Multipore is a relatively new development, the full extent of its application is yet to be realized. Its present use in two important fields and its possible application in another are discussed.

Wearing Apparel

Plain soft rubber Multipore has been used for several years as a basis of a high-quality rubber bathing suit that will not hold water, has excellent tear resistance, and is cool to wear. A nationally known corset manufacturer is now marketing a line of women's girdles and foundation garments made of Multipore. Soft rubber Multipore with 1,700 holes per square inch is usually used in both of these applications. Multipore has met with success in the clothing field not only because of its unique porous characteristics, but because of the use of especially purified latex rubber.

Batteries

Expanded hard rubber Multipore has been used commercially in large quantities as a paste retainer in high-quality heavy-duty storage batteries, permitting construction of high capacity batteries with exceptionally long service life. These batteries are used in industrial trucks, air conditioning apparatus, and train lighting systems.

Filtration

The use of a porous rubber sheeting in place of other types of filter media is advantageous in many processes

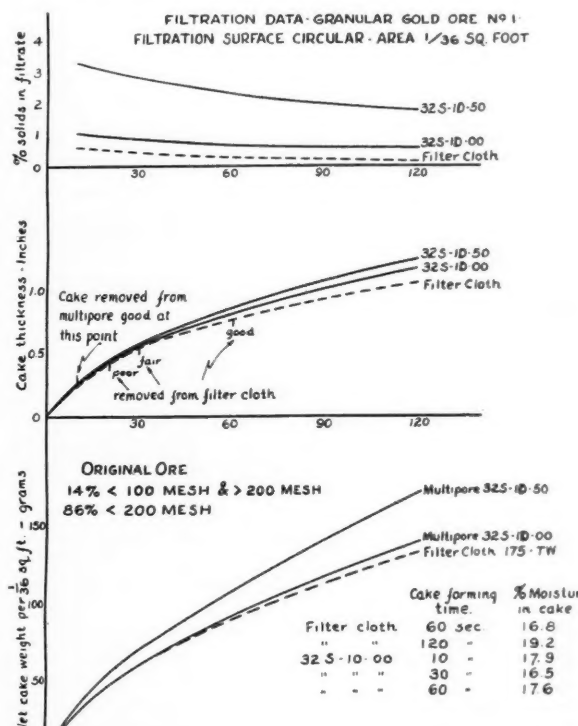


Fig. 5. Multipore vs. Filter Cloth as Filter Media for Granular Gold Ore

where flexibility and resistance to the action of corrosive substances are important. However prior to the development of Multipore no porous rubber or synthetic rubber sheeting was available with suitable characteristics. There are a number of specific applications in the filtration industry where Multipore looks promising. These include save-alls and other apparatus for the filtration of pulp in the paper industry; filtration of sewage sludge; mining ores; filtration of milk products; clarification of sugar, syrups, fruit juices, beer, and corrosive liquids in the chemical industry.

In view of the fact that the smallest pore diameter in Multipore is 0.004-inch, it might be assumed that Multipore would only be satisfactory for the filtration of very coarse particle substances. It is a practical fact, however, that if a suspension or slurry contains some coarse particles, these bridge across the pores and retain the fines. This is illustrated by the data shown in Figure 5 for the filtration of a finely ground ore, all of which passed through a 100 mesh, and 86% of which passed through a 200-mesh sieve.

Direct Filtration of Granular Materials. Experimental work has shown that Multipore may be used as a filtering medium for materials of a generally granular nature. Data on crushed ore samples typical of those filtered in the mining industry (Figure 5) show that if the proper type of Multipore is used, it has the following advantages over conventional filter cloths.

1. The smooth surface of Multipore and the absence of surface fibers permit the removal of much thinner cakes from the filter surface, thus increasing the capacity of a filter unit of the continuous type, such as the Oliver or Dorrco rotary filter.

2. Multipore apparently does not show progressive blinding. If any slight blinding should occur over a long period of time, Multipore can be cleaned either by flushing with water and air or by the application of chemicals without injury to the rubber.

3. Multipore can be used over a wide range of temperatures for filtration of materials from corrosive solutions.

Against these advantages Multipore yields slightly higher solids in the filtrate during the first portion of the filtration cycle. However for numerous processes in the mining and chemical industry it appears that this slightly turbid filtrate can either be recirculated or can be fed to an auxiliary "tailings" filter using a conventional cloth depending upon the type of material being filtered.

Clarification of Liquids. The clarification of liquids is usually accomplished by the precoat method, which involves the use of a layer of finely divided diatomaceous earth (Celite, Filter Aid) on top of a porous backing. In the clarification of corrosive liquids, sugar syrups, fruit juices, etc., the principal problem is to find a porous material to hold the precoat, that will have a reasonably long life under the severe operating conditions. The various types of filter-aid such as Celite are retained by plain Multipore provided the pore diameter is less than 0.007-inch, and by expanded Multipore provided the minor axis of the elliptical opening is below this figure. It appears that Multipore will be superior to other types of porous backings for many operations because of: (1) resistance to corrosion; (2) greater mechanical strength; (3) elasticity and long flexing life; (4) smooth surface—ease of cleaning; (5) cost, based on actual tonnage filtered; (6) absence of thermoplastic effects at high temperatures in most types.

Chemical Resistance of Multipore

In addition to all-purpose stocks for use in processes where operating conditions are not so severe, special Multipore compounds have been developed that exhibit unusual resistance to deterioration from specific chemicals in high concentrations at elevated temperatures. As an example of what has been accomplished in this direction, a large drum filter covered with soft rubber Multipore operated continuously in a bath of 25% sulphuric acid at a temperature of 180 to 190° F. for six weeks. At the end of this time the Multipore cover was in perfect condition.

General Atlas Adds New Plant

Marking the tenth anniversary of General Atlas Carbon Co. Sixty Wall St., New York, N. Y., producer of the special process black known as Gastex and the pellet form of Gastex known as Pelletex, announcement is made of the construction of a new plant at Guymon, Okla., by Vice President Carl J. Wright, who states the plant will be in operation early in September.

Nearly eleven years ago the first commercial unit for the production of black by a special process was put into operation by the newly formed General Atlas Carbon Co. For many years prior to that time the organization of Henry L. Doherty & Co., Inc., which controls General Atlas, had been working, experimentally, on efficient methods of producing black.

The Gastex process, which is different from the channel process, takes the carbon-laden gases, resulting from incomplete combustion in the furnaces, carries them through air cooling and water cooling systems and finally through a Cottrell electrical precipitator where the black is separated from the gases.

General Atlas started with two small units at its Pampa, Tex., plant, having a capacity of three million pounds per year. At the present time the company is operating five large units with a combined capacity of sixteen million pounds per year.

The decision to erect an entirely new plant was made because of an increasing demand for Pelletex, which is the form of Gastex now generally preferred for most compounds by plants equipped to handle it.

As it was considered advisable to locate the new plant in a state other than Texas so that the company would not be subjected to the same state regulations covering production, a site was selected about 1½ miles east of Guymon, Okla., which has a population of about 2,500 and will supply ample labor for the new plant. Guymon is in the Panhandle section of Oklahoma about 110 miles northwest of Pampa, the location of the other plant where General Atlas will continue the manufacture of both Gastex and Pelletex. The new plant site consisting of 42 acres, on the main line of the Chicago, Rock Island & Pacific Railroad. Construction work on the first two units of this plant was started several months ago. Each unit will produce ten thousand pounds of Pelletex a day. Plant facilities are being provided for two additional units which will be built as soon as market demands make them necessary.

Ten Ways of Promoting Rubber Furnishing Sales[1]

WHILE these suggestions originated as applying to a particular group of rubber products, many of them may well be utilized elsewhere as an aid to the establishment in the minds of rubber users of a more complete understanding as to the versatility of the basic material rubber. EDITOR'S NOTE.

1. The most important point to remember in selling rubber is that it is not one material but many. It is obviously the salesman's first job to make this clear to the customer, to prevent her confusing the rubber that is used on a floor with the rubber that fills a mattress.

2. If the public is not made to realize the basic differences in the material of different rubber products it will regard them *all* with suspicion. It generally tends to think of rubber as essentially an impermeable material, remembering the hot water bottle that keeps the water in and the rubber-lined mackintosh that keeps the water out. This is a help when selling rubber flooring, walling, or mats, a hindrance when selling a sponge rubber, latex or rubberized hair filled mattress, or upholstery in which rubber products are incorporated. With such merchandise the customer must be made aware of the porosity of the material, the fact that it has none of the clamminess inevitably associated in its mind with rubber in certain other forms.

3. One of the chief arguments made by the public against rubber bedding—based on experience gained on rubber-sheeted hospital beds—is that it will either be too hot or too cold. This is by no means true of the modern sponge mattress, and its self-ventilating properties, which keep its temperature the same as that of the surrounding atmosphere, are the point to stress.

4. The hygienic aspect of rubber in furnishing is one of the salesman's strongest weapons. He can stress the ease with which a floor can be kept completely clean, the ease with which ticking can be removed from mattresses and pillows for laundering.

5. The moth and vermin menace associated with certain sorts of furnishings can also be turned to good use in sales promotion. The moth problem can be an acute one, especially in upholstery and in carpet underlays. Rubber and latex products provide an environment that is not only uncongenial and unremunerative to the insect world, but one, it is said, that is definitely repellant, having slight antiseptic qualities.

6. Consider in selling rubber furnishings the customer with idiosyncracies, maybe with complaints. Rubber floors, rubber upholstery, rubber cushions and rubber beds are about the best sort of furnishings for sufferers from hay fever and asthma. Rubber, too, means silence, whether it be used under foot or on a kitchen table top. The comfort element is as important in floor covering as it is in bedding. Whether a solid rubber or sponge backed floor is used, fatigue is less than with any other floor covering of a similar nature.

7. Rubber can also be sold on the safety element—safety to those who walk down stairs on it, safety to things that are stood on it, safety to things it prevents coming into contact. The reduction of noise effected by rubber furnishings, both major and minor, is a feature that cannot be too strongly emphasized in selling.

8. Durability—the customer's own motor car tires provide an irrefutable argument—is one of the strongest selling points. This is especially true in the case of rubber flooring, which is perhaps slightly more expensive than alternative coverings. If rubber can roll over hard roads for thousands of miles at high speed it's going to stand up to a lot more walking on than it's ever likely to get.

9. The decorative properties of rubber, too, can be a powerful argument for its use, especially with the customer who wants something different." With rubber flooring it is almost as easy to provide special designs as standard ones, which is more than can be said of most furnishing materials. The same is also true of carpeting with a rubberized back.

10. Special colors are not outside the scope of the average pocket. Color matching is easier with rubber than with many materials, and manufacturers set out to provide facilities for matching floors to curtains, walls to the glaze of a bath; any rubber product, in fact, to any other furnishing material. In days when more attention is being paid to the ensemble than ever before, the ease with which one material can be matched to another is in itself a strong point to recommend that material.

[1] Reprinted from "Rubber and Latex in Furnishing & Decoration," June, 1939, issued by The British Rubber Publicity Association, 19 Fenchurch St., London, E.C.3, England.

Employe Relations

NATIONAL ASSOCIATION OF FOREMEN recently completed a survey covering 4,553 foremen to determine the relative importance of essential factors in employe relations, with the following results:

	Essential Factors	Pts.	%
1.	Prompt handling of grievances	52,834	82.8
2.	Careful interpretation and application of policies	50,667	79.4
3.	Written policies	49,577	77.7
4.	Safety and Sanitation	46,940	73.6
5.	Cooperation	43,463	68.1
6.	Recognition of service	43,269	67.8
7.	Incentives	42,380	66.4
8.	Personal interest	41,510	65.1
9.	Loyalty	38,352	60.1
10.	Security	35,786	56.1
11.	Careful selection of employes	35,520	55.7
12.	Fair compensation	33,939	53.2
13.	Promotion and lay-off policy	32,677	51.2
14.	Employe rating	32,602	51.1

Points were computed on the basis of 14 points for each first-place vote, 13 points for each second, etc. In some cases two or more factors were given equal ratings. The maximum number of points possible was 63,742.

Census of Manufactures: 1937 Rubber Products

MANUFACTURERS of rubber goods in the United States reported substantial increases in wages and production (as measured by value) and a moderate increase in employment for 1937 as compared with 1935 (the last preceding census year), according to figures compiled from returns of the recent Biennial Census of Manufacturers, released recently by Director William L. Austin, Bureau of the Census, Department of Commerce, Washington, D. C.

The total value of the products made in the group of Rubber Goods industries in 1937 was $883,032,546, an increase of 30.3% over the 1935 figure, $677,659,111, but 21% below the 1929 figure of $1,117,460,252. The number of wage earners employed in rubber manufacturing establishments in 1937 was 129,818, an increase of 13.2% as compared with 114,681 reported for 1935, and their wages, $171,304,546, exceeded the 1935 figure, $133,715,235, by 28.1%.

Manufacturers of rubber products are assigned, for Manufactures Census purposes, to three industry classifications: namely, Rubber Tires and Inner Tubes; Rubber Boots and Shoes; and Rubber Goods Other than Tires, Inner Tubes, and Boots and Shoes. Establishments in the last-mentioned industry group showed the largest increase in value of products, 36%, from $178,045,388 in 1935 to $242,716,952 in 1937.

Complete statistics for 1937, with comparative figures for 1935 and 1933, are given in the following tables.

TABLE 1. GENERAL STATISTICS, FOR THE UNITED STATES: 1937, 1935, AND 1933

(Because they account for a negligible portion of the national output, plants with annual production value under $5,000 have been excluded since 1919)

	1937	1935	1933	% of Increase or Decrease (—) 1935—1937	% of Increase or Decrease (—) 1933—1937
THE INDUSTRIES AS A GROUP					
Number of Establishments	478	466	408	2.6	17.2
Proprietors and firm members	98	107	79	—8.4	*
Salaried personnel, total†	20,147	16,845	‡	19.6	....
Salaried officers of corporations	665	779	‡	—14.6	....
Supervisory employes	5,135	16,066¶	2,677	21.3	91.8
Clerical and other salaried employes	14,347		12,197		17.6
Salaries paid, total†	$45,022,086	$35,699,580	‡	26.1	....
To salaried officers of corporations	$5,167,578	$5,527,849	‡	—6.5	....
To supervisory employes	$14,898,242	$30,171,731¶	$8,828,335	32.1	68.8
To clerical and other salaried employes	$24,956,266		$17,494,763		42.6
Wage earners (average for the year)	129,818	114,681	106,283	13.2	22.1
Wages	$171,304,546	$133,715,235	$99,116,552	28.1	72.8
Cost of materials, etc., total	$514,260,412	$368,810,953§	$211,396,716x	39.4	143.3
Cost of materials, supplies, and containers	496,612,787	353,375,428	‡	40.5	....
Cost of fuel	7,800,695	7,876,440	‡	—1.0	....
Cost of purchased electric energy	9,318,849	7,329,993	‡	27.1	....
Cost of contract work	528,081	229,092	‡	130.5	....
Value of products	883,032,546	677,659,111	472,743,587	30.3	86.8
Value added by manufacture (a)	368,772,134	308,848,158	261,346,871	19.4	41.1
RUBBER TIRES AND INNER TUBES					
Number of Establishments	46	42	44	*	*
Proprietors and firm members	1	1	1	....	....
Salaried personnel, total†	10,952	8,587	‡	27.5	....
Salaried officers of corporations	59	121	‡	—51.2	....
Supervisory employes	2,396	8,466b	1,019	28.7	135.1
Clerical and other salaried employes	8,497		7,232		17.5
Salaries paid, total†	$25,323,979	$18,807,430	‡	34.6	....
To salaried officers of corporations	$907,914	$1,431,545	‡	—36.6	....
To supervisory employes	$7,386,288	$17,375,885b	$4,152,538	40.5	77.9
To clerical and other salaried employes	$17,029,777		$11,758,463		44.8
Wage earners (average for the year)	63,290	57,128	52,976	10.8	19.5
Wages	$96,706,731	$78,253,489	$54,737,313	23.6	76.7
Cost of materials, etc., total	366,858,443	265,515,401	139,392,070x	38.2	163.2
Cost of materials, supplies, and containers	358,110,614	257,817,452	‡	38.9	....
Cost of fuel	4,395,850	4,533,604	‡	—3.0	....
Cost of purchased electric energy	4,323,168	3,164,345	‡	36.6	....
Cost of contract work	28,811	......	‡	....	....
Value of products	575,860,262	446,091,602	299,313,263	29.1	92.4
Value added by manufacture (a)	209,001,819	180,576,201	159,921,193	15.7	30.7
RUBBER BOOTS AND SHOES					
Number of Establishments	12	12	13	....	*
Proprietors and firm members	....	....	....	....	....
Salaried personnel, total†	2,375	2,131	‡	11.5	....
Salaried officers of corporations	35	38	‡	*	....
Supervisory employes	728	2,093c	529	11.8	37.6
Clerical and other salaried employes	1,612		1,500		7.5
Salaries paid, total†	$4,223,618	$3,724,482	‡	13.4	....
To salaried officers of corporations	$285,032	$323,401	‡	—11.9	....
To supervisory employes	$1,935,615	$3,401,081c	$1,695,566	15.8	14.2
To clerical and other salaried employes	$2,002,971		$1,472,929		36.0
Wage earners (average for the year)	18,356	17,246	18,102	6.4	1.4
Wages	$20,421,676	$16,113,490	$14,440,403	26.7	41.4
Cost of materials, etc., total	$27,474,556	$20,820,754§	$14,124,109x	32.0	94.5
Cost of materials, supplies, and containers	26,215,436	19,512,524	‡	34.4	....
Cost of fuel	425,902	591,548	‡	—28.0	....
Cost of purchased electric energy	659,120	625,924	‡	5.3	....
Cost of contract work	174,098	90,758	‡	91.8	....
Value of products	64,455,332	53,162,121	42,018,877	21.2	53.4
Value added by manufacture (a)	36,980,776	32,341,367	27,894,768	14.3	32.6

* Per cent. not computed where base is less than 100.
† No data for employes of central administrative offices are included in the figures for any year.
(Other footnotes at end of table on next page.)

TABLE 1 (*Continued*)

RUBBER GOODS OTHER THAN TIRES, INNER TUBES, AND BOOTS AND SHOES	1937	1935	1933	% of Increase or Decrease (—) 1935—1937	1933—1937
Number of Establishments	420	412	351	1.9	19.7
Proprietors and firm members	97	106	78	—8.5	*
Salaried personnel, total†	6,820	6,127	‡	11.3	....
Salaried officers of corporations	571	620	‡	—7.9	....
Supervisory employes	2,011	5,507d	1,129	13.5	78.1
Clerical and other salaried employes	4,238		3,465		22.3
Salaries paid, total†	$15,474,489	$13,167,668	‡	17.5	....
To salaried officers of corporations	$3,974,632	$3,772,903	‡	5.3	....
To supervisory employes	$5,576,339	$9,394,765d	$2,980,231	22.4	87.1
To clerical and other salaried employes	$5,923,518		$4,263,371		38.9
Wage earners (average for the year)	48,172	40,307	35,205	19.5	36.8
Wages	$54,176,139	$39,348,256	$29,938,836	37.7	81.0
Cost of materials, etc., total	119,927,413	82,474,798§	57,880,537x	45.4	107.2
Cost of materials, supplies, and containers	112,286,737	76,045,452	‡	47.7	....
Cost of fuel	2,978,943	2,751,288	‡	8.3	....
Cost of purchased electric energy	4,336,561	3,539,724	‡	22.5	....
Cost of contract work	325,172	138,334	‡	135.1	....
Value of products	242,716,952	178,405,388	131,411,447	36.0	84.7
Value added by manufacture (*a*)	122,789,539	95,930,590	73,530,910	28.0	67.0

‡ Data incomplete.
¶ Number of employes and salaries reported as follows: Supervisory, 3, 358; salaries, $9,231,592. Technical, 1,524; salaries, $4,126,456. Clerical, 11,184; salaries, $16,813,683.
§ Revised to include cost of contract work.
x Does not include cost of contract work.
a Value added by manufacture calculated by deducting cost of materials, etc., fuel, purchased electric energy, and contract work from value of products.
b Number of employes and salaries reported as follows: Supervisory, 1, 393; salaries, $4,030,567. Technical, 829; salaries, $2,420,776. Clerical, 6,244; salaries, $10,924,542.
c Number of employes and salaries reported as follows: Supervisory, 638; salaries, $1,551,186. Technical, 223; salaries, $568,629. Clerical, 1,232; salaries, $1,281,266.
d Number of employes and salaries reported as follows: Supervisory, 1,327; salaries, $3,649,839. Technical, 472; salaries, $1,137,051. Clerical, 3,708; salaries, $4,607,875.

TABLE 2. SUMMARY, BY STATES: 1937*

	Number of Establishments	Salaried Officers and Employes	Wage Earners (Average for the Year)	Salaries	Wages	Cost of Materials, Etc., Fuel, Purchased Energy, and Contract Work	Value of Products	Value Added by Manufacture
THE INDUSTRIES AS A GROUP								
United States	478	20,147	129,818	$45,022,086	$171,304,546	$514,260,412	$883,032,546	$368,772,134
RUBBER TIRES AND INNER TUBES								
United States	46	10,952	63,290	25,323,979	96,706,731	366,858,443	575,860,262	209,001,819
California	6	801	5,050	1,719,533	7,729,306	44,856,274	65,013,521	20,157,247
Ohio	17	6,913	38,719	17,319,689	60,868,632	179,133,338	307,255,214	128,121,876
Pennsylvania	5	259	2,032	582,101	2,707,075	12,869,154	20,795,115	7,925,961
Other States†,‡	18	2,979	17,488	5,702,656	25,401,718	129,999,677	182,796,412	52,796,735
RUBBER BOOTS AND SHOES								
United States	12	2,375	18,356	4,223,618	20,421,676	27,474,556	64,455,332	36,980,776
Massachusetts	4	932	6,034	2,030,648	6,815,775	8,964,671	22,761,637	13,796,966
Other States¶	8	1,443	12,322	2,192,970	13,605,901	18,509,885	41,693,695	23,183,810
RUBBER GOODS OTHER THAN TIRES, INNER TUBES, AND BOOTS AND SHOES								
United States	420	6,820	48,172	15,474,489	54,176,139	119,927,413	242,716,952	122,789,539
California	38	226	1,135	481,144	1,445,938	3,911,333	7,247,706	3,336,373
Connecticut	18	401	2,534	879,305	2,704,752	6,002,220	12,190,231	6,188,011
Illinois	23	241	2,788	647,609	3,258,526	5,604,256	12,147,684	6,543,428
Indiana	13	239	2,309	552,516	2,053,401	3,022,053	7,013,374	3,991,321
Kentucky	3	5	24	5,700	19,764	29,384	58,210	28,826
Maryland	7	82	508	155,613	324,594	990,658	1,709,249	718,591
Michigan	12	158	1,237	401,844	1,780,864	3,926,590	8,431,955	4,505,365
Missouri	13	95	757	234,609	744,713	3,093,522	5,300,314	2,206,792
New Jersey	48	1,383	9,999	3,237,778	12,299,783	21,515,739	46,159,175	24,643,436
New York	44	706	4,878	1,640,113	5,765,716	14,809,819	29,435,272	14,625,453
Ohio	72	1,094	7,682	2,449,664	8,642,957	18,051,705	37,119,777	19,068,072
Pennsylvania	19	439	2,475	979,931	2,747,919	6,246,290	11,750,232	5,503,942
Rhode Island	8	507	3,290	1,102,263	3,532,401	6,799,611	14,481,321	7,681,710
Tennessee	3	8	20	12,655	13,702	49,521	101,572	52,051
Wisconsin	9	100	570	197,823	496,340	1,484,489	3,407,211	1,922,722
Other States‡, §	90	1,136	7,966	2,495,922	8,344,769	24,390,223	46,163,669	21,773,446

† As the figures for Massachusetts, one of the leading states in the Rubber Tires and Inner Tubes industry, cannot be given separately for this industry without disclosing approximations of data for individual establishments, they are presented in combination with the Massachusetts figures for the Rubber Goods Other than Tires, Inner Tubes, and Boots and Shoes industry, in the statement below. The Massachusetts figures are included above in the "Other States" entries for the respective industries.

Number of establishments	61	Wages	$9,009,733
Salaried officers and employes	1,169	Cost of materials, etc., fuel, purchased energy, and contract work	32,238,128
Wage earners (average for the year)	7,846	Value of products	54,687,308
Salaries	$2,620,501	Value added by manufacture	22,449,180

‡ Alabama, 2 establishments; Colorado, 1; Connecticut, 2; Illinois, 1; Indiana, 1; Maryland, 2; Massachusetts, 1; Michigan, 3; Minnesota, 1; New Jersey, 1; New York, 1; Tennessee, 1; and Wisconsin, 1.
¶ Connecticut, 2 establishments; Illinois, 1; Indiana, 1; Missouri, 1; New Jersey, 1; Rhode Island, 1; and Wisconsin, 1.
§ Alabama, 1 establishment; Arkansas, 1; Colorado, 1; Delaware, 3; Georgia, 1; Iowa, 2; Maine, 2; Massachusetts, 60; Minnesota, 3; Nebraska, 1; North Carolina, 1; Oklahoma, 1; Oregon, 2; South Carolina, 2; Texas, 3; Vermont, 1; Virginia, 2; and Washington, 3.
* See also footnotes † and *a*, Table 1.

TABLE 3. WAGE EARNERS, BY MONTHS, FOR THE UNITED STATES, 1937, AND 1935, AND FOR STATES, 1937

	Average Number Employed During Year	Number Reported for— January	February	March	April	May	June	July	August	September	October	November	December
THE INDUSTRIES AS A GROUP													
United States													
1937	129,818	133,231	133,844	127,047	126,648	136,138	132,956	131,645	131,498	132,255	131,198	123,510	117,843
1935	114,735*	115,294	117,950	118,163	118,128	115,470	112,347	109,554	110,721	113,445	115,414	114,877	115,462
RUBBER TIRES AND INNER TUBES													
United States													
1937	63,290	66,359	66,979	57,794	57,777	67,266	66,654	65,756	65,650	65,371	63,491	59,296	57,086
1935	57,137*	59,177	59,906	59,596	59,421	58,563	57,763	56,028	55,041	55,258	55,405	54,564	54,921
States, 1937													
California	5,050	5,220	5,253	5,170	5,203	5,245	5,212	4,965	4,955	4,951	4,922	4,794	4,714
Michigan	6,007	5,606	5,726	5,755	5,699	5,805	5,708	6,426	6,500	6,559	6,500	6,106	5,689
Ohio	38,719	42,414	42,377	33,074	32,607	41,701	41,220	40,422	40,256	40,025	38,544	36,590	35,394
Pennsylvania	2,032	1,857	1,943	1,943	2,072	2,110	2,048	2,043	2,073	2,101	2,070	2,015	2,114

* As these averages are derived from the figures for the 12 months in the calendar year, they differ from the corresponding averages in Table 1, which are derived in part from figures for months in fiscal years differing from the calendar year.

TABLE 3 (*Continued*)

	Average Number Employed During Year	January	February	March	April	May	June	July	August	September	October	November	December
		Number Reported for											
RUBBER BOOTS AND SHOES													
United States													
1937	18,356	18,724	17,879	19,581	18,477	18,444	17,481	18,416	18,580	18,914	18,923	17,714	17,137
1935	17,246	17,229	17,630	17,466	17,538	16,352	15,564	15,149	17,356	17,897	18,031	18,159	18,586
State, 1937													
Massachusetts	6,034	6,661	6,040	6,242	5,987	5,996	6,063	5,797	5,834	6,229	6,191	6,141	5,231
RUBBER GOODS OTHER THAN TIRES, INNER TUBES, AND BOOTS AND SHOES													
United States													
1937	48,172	48,148	48,986	49,672	50,394	50,428	48,821	47,473	47,268	47,970	48,784	46,500	43,620
1935	40,352*	38,888	40,414	41,101	41,169	40,555	39,020	38,377	38,324	40,290	41,978	42,154	41,955
States, 1937													
California	1,135	1,029	1,076	1,116	1,197	1,219	1,212	1,185	1,185	1,168	1,127	1,082	1,027
Connecticut	2,534	2,634	2,618	2,780	2,637	2,488	2,470	2,382	2,396	2,538	2,608	2,497	2,366
Delaware	503	468	507	493	529	559	545	541	424	515	543	509	405
Illinois	2,788	3,096	2,693	3,124	2,974	2,954	2,749	2,408	2,662	2,983	3,200	2,477	2,131
Indiana	2,309	2,088	2,089	2,194	2,139	2,240	2,250	2,201	2,083	2,536	2,809	2,790	2,292
Kentucky	24	24	13	15	32	32	18	26	14	30	33	34	15
Maryland	508	445	455	463	459	519	494	535	574	581	563	521	488
Massachusetts†	7,846	8,490	8,703	8,690	8,590	8,501	7,983	7,674	7,537	7,281	7,228	6,742	6,736
Michigan	1,237	1,309	1,317	1,272	1,280	1,221	1,187	1,142	1,078	1,192	1,284	1,311	1,252
Missouri	757	718	733	760	786	798	793	819	804	712	701	736	728
New Jersey	9,999	9,572	9,733	9,871	10,160	10,286	10,211	10,209	10,296	10,128	10,074	9,979	9,464
New York	4,878	4,807	5,008	5,072	5,064	5,083	4,756	4,841	4,738	4,833	4,878	4,790	4,668
Ohio	7,682	7,782	7,925	8,140	8,036	8,028	7,959	7,632	7,420	7,284	7,584	7,425	6,966
Pennsylvania	2,475	2,487	2,647	2,577	2,604	2,619	2,555	2,415	2,395	2,439	2,504	2,368	2,088
Rhode Island	3,290	3,445	3,528	3,148	3,907	3,904	3,554	3,113	3,112	3,024	3,023	2,845	2,873
Tennessee	20	14	15	17	19	20	25	27	26	25	19	16	18
Texas	43	42	42	43	43	43	43	43	43	44	44	44	44
Washington	25	20	20	23	22	33	26	22	29	33	28	24	20
Wisconsin	570	554	581	569	544	549	592	551	660	659	633	533	416

† See footnote †, Table 2.

TABLE 4. PRODUCTS, BY KIND, QUANTITY, AND VALUE, FOR THE UNITED STATES: 1937, 1935, AND 1933

	1937	1935	1933
1. The Rubber Products group of industries, total value	$883,032,546	$677,659,111	$472,743,587
2. Rubber goods	865,777,138	663,945,115	465,309,741
3. Other products (not classified in these industries)	17,255,408	13,713,996	4,480,077
4. Rubber goods and other products not reported separately (on abridged schedule)*	......	......	2,953,769
5. Rubber goods made as secondary products in industries outside this group	12,848,507	7,776,566	3,305,223
Rubber goods, aggregate (sum of 2 and 5)	$878,625,645	$671,721,681	$468,614,964
(*a*) Tires and inner tubes, total value	$478,770,897	$374,264,436	$256,512,514
Pneumatic tires and casings:			
Motor-vehicle, except motorcycle and bicycle—			
Total number	54,113,445	48,764,713	45,375,552
Total value	$412,765,798	$322,193,418	$221,050,854
Passenger-car—			
Number	45,668,599	42,479,133	
Value	$253,270,878	$221,555,480	
Truck and bus—			
Number	7,702,436	6,003,338	
Value	$156,459,385	$99,852,136	
Airplane—			†
Number	32,710	28,086	
Value	$667,985	$451,684	
All other—			
Number	709,700	254,156	
Value	$2,367,550	$334,118	
Motorcycle and bicycle—			
Single-tube tires—			
Number	1,654,216	2,338,767	
Value	$1,390,700	$1,751,198	
Casings—			
Number	3,402,263	1,667,709	
Value	$3,191,864	$2,100,351	
Inner tubes:			
Passenger-car, truck, and bus—			
Number	52,372,908	47,760,679	46,811,770
Value	$55,739,387	$44,386,374	$31,715.479
Airplane—			
Number	25,026	20,242	
Value	$101,912	$67,088	
Motorcycle and bicycle—			
Number	3,397,286		
Value	$1,186,697		
All other—		1,529,790	
Number	167,906	$660,895	
Value	$470,135		
Solid and cushion tires:			
Truck and bus for highway transportation—			
Number	22,697	36,790	
Value	$875,920	$1,533,681	
Industrial truck, tractor, and trailer—			
Number	232,297	116,852	$3,746,181‡
Value	$1,547,769	$853,913	
All other, including carriage and other tiring—			
Pounds	13,566,853	6,993,794	
Value	$1,500,715	$717,518	
(*b*) Boots and shoes, total value	$58,269,258	$48,261,613	$41,513,460
Rubber-soled canvas shoes:			
Total pairs	31,519,085	23,955,089	29,689,163
Total Value	$18,042,154	$12,342,790	$13,813,171
Base shoes—			
Pairs	7,784,834		
Value	$3,417,145		
Lace-to-toe trimmed shoes—			
Pairs	11,246,272		
Value	$6,584,672		
Plain oxfords and bals—		23,955,089	29,689,163
Pairs	6,450,332	$12,342,790	$13,813,171
Value	$3,717,658		
Specialty oxfords and pumps—			
Pairs	6,037,647		
Value	$4,322,679		
Rubber boots:			
Pairs	3,884,195	3,029,126	2,622,311
Value	$7,624,737	$5,534,346	$4,658,534
Lumbermen's and pacs:			
Pairs	1,357,227	1,880,728	1,201,189
Value	$2,808,002	$3,362,006	$1,661,145
Arctics and gaiters:			
Buckle and automatic—			
Pairs	4,566,856	4,776,853	
Value	$7,176,184	$6,788,272	
Style, rubber or cloth—			$15,814,586
Pairs	15,558,456	14,568,756	$13,374,148
Value	$11,170,568	$10,796,311	
Other shoes, rubbers, and footholds:			
Pairs	20,116,063	16,583,175	15,968,426
Value	$11,447,613	$9,437,888	$8,006,462
(*c*) Rubber goods other than tire, inner tubes, and boots and shoes, total value	$341,585,490	$249,195,632	$170,588,990
Rubber heels, made for sale as such:			
Pairs	295,081,194	278,369,016	272,504,312
Value	$16,285,139	$11,594,192	$11,119,047
Rubber soles, including composition or fiber, made for sale as such:			
Pairs	72,476,284	69,655,749	91,994,794
Value	$10,750,044	$7,258,594	$8,315,846
Rubber soling strips and top-lift sheets:			
Square feet	8,072,411	9,943,849	10,752,949
Value	$2,075,999	$2,667,089	$1,711,451
Rubberized fabrics, made for sale as such, total value	$21,631,457	$20,059,116	$18,197,918
Automobile and carriage:			
Square yards	6,006,465	5,227,135	8,620,009
Value	$2,122,853	$1,873,614	$3,361,918
Raincoat:			
Square yards	21,374,062	19,975,411	18,064,141
Value	$4,873,452	$4,362,658	$5,455,614
Hospital sheeting:			
Square yards	2,982,123	2,509,073	2,239,984
Value	$1,072,522	$838,641	$740,831
All other:			
Square yards	39,252,005	43,634,069	42,326,587
Value	$13,562,630	$12,984,203	$8,639,555

(Footnotes at end of table on next page)

TABLE 4 (*Continued*)

(*c*) Rubber goods other than tires, etc. (*Continued*)

	1937	1935	1933
Mechanical rubber goods:			
Rubber belting—			
Transmission (flat)—			
Pounds	21,793,187	15,549,275	13,745,112
Value	$13,381,938	$8,976,384	$6,512,277
Conveyer and elevator—			
Pounds	15,759,803	16,347,418	
Value	$6,901,352	$4,545,938	
Fan belts—			
Pounds	14,443,005	12,533,594	16,882,692
Value	$8,291,974	$5,552,461	$6,416,181
All other—			
Pounds	6,710,485	3,932,509	
Value	$3,484,641	$1,422,797	
Rubber hose—			
Garden—			
Pounds	46,932,725	31,902,708	¶
Value	$7,058,709	$4,113,124	$3,783,080§
Fire hose—			
Pounds	9,345,767	7,269,635	¶
Value	$4,726,025	$3,599,019	$2,622,418§
Airbrake, airline, and other pneumatic—			
Pounds	13,486,496	10,134,479	
Value	$4,914,841	$3,370,924	¶
All other rubber hose—			$10,356,068§
Pounds	65,460,793	44,286,800	
Value	$19,218,945	$13,306,963	
Rubber tubing—			
Pounds	22,961,182	13,607,924	13,280,049
Value	$4,491,613	$2,235,798	$1,312,507
Rubber packing—			
Pounds	14,046,511	11,408,903	9,328,083
Value	$3,550,830	$2,736,695	$1,872,387
Washers, gaskets, valves, pump sleeves, and liner strips—			
Pounds	15,017,089	5,168,301	3,811,441
Value	$5,035,917	$2,106,441	$1,473,651
Insulation products—			
Rubber and friction tape—			
Pounds	21,112,965	12,380,235	11,439,375
Value	$4,538,355	$2,851,788	$2,134,313
Molded articles for motor vehicles (vibration and sound)—			
Pounds	60,420,110		
Value	$13,223,241	x	x
Other insulation products (compounds and insulators)—			
Pounds	10,596,082		
Value	$2,893,880	x	x
Rubber-covered rolls (all sizes), value	$4,854,772	$3,727,742	$2,660,551
Plumbers' rubber goods, value	$1,556,532	$1,127,953	
Other mechanical rubber goods, value	$37,349,249	$31,426,644	$15,870,856
Hard-rubber goods, except druggists' sundries, total value	$16,711,401	$14,031,661	$9,927,599
Battery jars, boxes, and parts, value	7,042,480	6,782,740	4,338,731
Mouthpieces for pipes and cigar and cigarette holders, value	401,103	283,984	
Combs, value	2,261,676	6,964,937	5,588,868
Other hard-rubber goods, value	7,006,142		
Druggists' and medical sundries, except rubber gloves:			
Water bottles and fountain syringes—			
Dozens	640,554	579,724	552,039
Value	$3,372,875	$2,496,349	$2,191,156
Nipples and pacifiers—			
Gross	517,281	474,004	
Value	$1,209,716	$1,196,219	
All other, including medical and surgical hard-rubber goods, value	$5,747,022	$3,941,142	$3,564,437
Rubber erasers, except pencil plugs:			
Pounds	1,679,373	1,205,693	*a*
Value	$902,231	$632,512	x
Rubber bands:			
Pounds	4,274,434	3,877,863	3,308,968
Value	$1,749,292	$1,262,937	$809,813
Rubber gloves:			
Electricians' gloves—			
Dozen pairs	14,716	23,143	
Value	$275,862	$226,265	
Surgeons' and household gloves—			
Dozen pairs	1,185,224		1,009,528
Value	$2,172,950	1,264,630	$1,676,196
Other rubber gloves and mittens—		$2,631,154	
Dozen pairs	175,427		
Value	$532,735		
Rubber Cement:			
Gallons	15,447,489	5,970,854	3,742,018§
Value	$8,931,113	$3,142,605	$2,099,595§
Rubber flooring (tile or sheet):			
Square feet	8,771,293	5,905,877	4,325,019
Value	$2,664,597	$1,704,421	$1,237,010
Rubber mats and matting, Value	$10,624,592	$8,972,976	$3,926,486
Tire sundries and repair materials, value	$8,899,832		
Camelback:		$14,035,000	x
Pounds	34,126,448		
Value	$7,229,895		
Rubber thread:			
Pounds	5,618,105	5,415,381	4,809,008
Value	$3,475,477	$2,550,833	$2,236,011
Jar rings:			
Gross	6,117,233	7,571,331	7,441,700
Value	$1,954,964	$2,072,401	$1,784,407
Bathing caps:			
Dozens	789,504	945,211	1,228,276
Value	$1,230,106	$1,167,456	$1,338,278
Sponge-rubber products not elsewhere classified, value	$9,291,743	$4,237,980	$1,489,832
Gutta-percha products, value	$3,453,443	†	†
Other manufactures of rubber, value	$35,202,663*b*	$40,440,282	$43,949,619
Reclaimed rubber produced, including that transferred to other plants of same company:			
Pounds	399,629,061	266,784,790	*a*
Value	$19,737,528	$11,773,777	x

* Incomplete, due to the fact that an abridged questionnaire, which did not ask for detailed production data, was used for the Census of 1933.

† No data.

‡ Includes data for a small quantity of casings and tubes other than those for motor vehicles, motorcycles, and bicycles.

¶ Data incomplete.

§ Incomplete. Small establishments canvassed with abridged schedule. (See footnote*.)

x Included in figure for "Other manufactures of rubber."

a No comparable data.

b Includes values as follows: For 1937—rubber clothing, $11,054,705; toy balloons, $2,488,299; and play balls and other rubber toys, $4,777,832. For 1935—rubber clothing, $10,174,176; toy balloons, $1,338,128; and play balls and other rubber toys, $2,935,866. The total value of rubber toys is given in the report for "Toys Not Including Children's Wheel Goods or Sleds, Games, and Playground Equipment."

TABLE 5. RUBBER CONSUMED IN THE RUBBER INDUSTRIES, BY KIND, QUANTITY, AND COST, FOR THE UNITED STATES: 1937, 1935, AND 1933

[Ton, 2,240 pounds]

	1937	1935	1933
CRUDE AND RECLAIMED RUBBER CONSUMED, BY INDUSTRIES			
Total tons consumed	687,176	583,073	*
Purchased:			
Tons	631,600	545,669	*
Cost	$231,517,943	$126,228,184	*
Reclaimed and consumed by same establishments, tons	55,576	37,404	*
Crude rubber consumed:			
Total tons	531,091	469,448	393,871†
Total cost	$219,606,315	$118,227,609	$44,749,520†
Rubber Tires and Inner Tubes industry—			
Tons	423,999	378,453	315,718
Cost	$174,188,060	$94,318,413	$34,913,896
Rubber Boots and Shoes industry—			
Tons	22,213	20,074	17,994
Cost	$9,334,062	$5,320,107	$2,237,959
Rubber Goods Other than Tires, Inner Tubes, and Boots and Shoes industry—			
Tons	84,879	70,921	60,159†
Cost	$36,084,193	$18,589,089	$7,597,665†
Reclaimed rubber consumed, total tons	156,085	113,625	*
Purchased—			
Tons	100,509	76,221	81,936†
Cost	$11,911,628	$8,000,575	$6,421,753†
Rubber Tires and Inner Tubes industry—			
Tons	44,824	26,317	40,203
Cost	$5,129,360	$2,701,884	$3,143,675
Rubber Boots and Shoes industry—			
Tons	2,779	1,484	1,252
Cost	$320,722	$160,720	$117,960
Rubber Goods Other than Tires, Inner Tubes, and Boots and Shoes industry—			
Tons	52,906	48,420	40,481†
Cost	$6,461,546	$5,137,971	$3,160,118†
Reclaimed and consumed, total tons	55,576	37,404	*
Rubber Tires and Inner Tubes industry, tons	37,372	30,483	*
Rubber Boots and Shoes, and Rubber Goods Other than Tires, Inner Tubes, and Boots and Shoes industries, tons	18,204	6,921	*

* No data.

†Incomplete. An abridged schedule, which did not provide for reporting consumption of rubber, was used for canvassing the smaller establishments in the 1933 Census.

(*Continued on page* 45)

Lacquer Finish for Rubber Articles

E. M. Hayden[1]

THE finishing of rubber or rubber coated articles with lacquer has become an important and very intricate subject. There are many types of rubber compounds, all of which have a definite effect on the lacquer. There are lacquers which can be applied to certain rubber compounds before cure, and certain rubber articles cannot, for various reasons, be lacquered except after cure. In order that this subject may be discussed in an orderly manner, it is necessary to classify the rubber articles into various groups, subdivide the lacquers into their types, and then consider the proper type of lacquer for each group.

Rubber articles may be divided into two groups, the first of which might be termed articles which cannot be lacquered until after cure, because they are formed in a mold and cured while in the mold. The greater adherence of lacquer to the mold than to the rubber would prevent a perfect coating on the rubber after the mold is opened. Under this classification come: (a) molded goods such as hot water bottles, rubber electric plugs, etc.; (b) dolls and mannequin figures; (c) rubber balls. The second group comprises those articles which can be lacquered before cure, although in some cases this is not done. In this class come: (a) quarterlining and sock-lining; (b) leatherettes and raincoat materials; and (c) cushion and upholstery materials; and (d) rubber shoes, etc.

The various types of lacquers may be divided into: Type 1, applied after cure, which may be clear or pigmented, and Type 2, which may be called before cure lacquers.

It has been found that, generally speaking, it is better to apply lacquer to rubber before cure than after cure. Many tests have been made with rubber compounds suitable for lacquering before or after cure and with the best lacquer formulation for the compound. Almost invariably the lacquer applied before cure has better adhesion, is drier to the feel, and has better elongation.

Lacquering after Cure

With regard to after-cure lacquer on molded rubber articles, the selection of materials to be used in the rubber compounds should be made with care as certain materials affect the quality of the lacquer film and the adhesion of the lacquer.

Discoloration

Many molding compounds contain ingredients which discolor both clear and colored lacquers. In a great many cases this discoloration comes from two main sources: (a) ingredients which bleed into the lacquer, and (b) those which affect the lacquer probably through some chemical reaction.

In discussing group (a) there are two main causes for discoloration by bleeding: first, pigments which are readily soluble in lacquer solvents and lacquer plasticizers; second, so-called mineral rubbers or asphalts which are readily soluble in either petroleum, or hydrocarbon solvents. They may also be soluble in some of the true lacquer solvents such as the acetates. As lacquers invariably contain one or more of these solvents, bleeding invariably occurs wherever such rubber ingredients are used.

The (b) class has proved to be, in general, antioxidants, and the majority of antioxidants are liable to discolor lacquer. Just what causes this discoloration, whether it is "bleeding" or an actual chemical reaction, has not been definitely determined. However indications are that it is probably a chemical reaction. The principal problem of discoloration is in the use of colored lacquers in the very light shades and in clear lacquers over light colored rubber compounds. In the case of black lacquer on black rubber any existing discoloration is not readily apparent.

Tackiness

Certain ingredients used in rubber compounding leach into the lacquer, either by means of the solvents or the lacquer plasticizers, and affect the lacquer coat. Some rubber compounds apparently feel dry before lacquering, but when the lacquer coat is thoroughly dried, the surface remains sticky. In such a case it was found that the rubber compound contained an excessive amount of softening agent which apparently leached out into the lacquer and caused what might be termed a type of excessive plasticizing of the lacquer film.

Adhesion

Some molded rubber products have a coating of wax or other finishing material to keep the rubber from sticking to the mold. This not only tends to slow up the drying of the lacquer in certain cases, but it also has a tendency to cause very poor adhesion of the lacquer to the cured rubber. There are several other materials which in rubber compounds should be treated with care, such as the water soluble salts found in and on precipitated latex. These are special cases, however, and will not be discussed here.

Molded Goods

Under this class could be placed such items as hot water bottles, atomizer bulbs, etc. In most cases these articles are lacquered to produce a selected color, luster, and good feel. Normally with this type of goods little trouble is encountered. But with an especially soft rubber such as is sometimes used in hot water bottles it is difficult to get a very dry and non-marking finish together with high flexibility.

Another type of molded rubber article such as electrical connection plugs is troublesome, invariably containing mineral rubber or some such discoloring agent, particularly where the demand is for a pale cream or ivory lacquer. If the rubber formulator kept in mind that these goods were to be lacquered with a light colored lacquer,

[1] Vice president and technical director, The Stanley Chemical Co., East Berlin, Conn.

the manufacturer of the plugs would be saved a great many headaches, as would the manufacturer of the lacquer, and far superior products would be produced.

Colored lacquer should be used only on rubber of approximately the same color, thus eliminating unsightly results due to slight crazing, cracks, or abrasion of the lacquer such as are evident when an ivory or other light colored lacquer is placed over black rubber.

Dolls and Mannequins

Most of the lacquers furnished for this type of article are in the dull flesh colors. The question of adhesion does not appear to be troublesome in this type of goods, although producers require extreme flexibility, particularly on items such as display hands for gloves where the hands and fingers are severely and frequently flexed.

Rubber Balls

Lacquer for rubber balls has always been a rather difficult problem due to the fact that the severe shock of bouncing a ball causes great distortion, and unless there is both good adhesion and flexibility, the lacquer on the ball soon cracks. Owing to the need of speed in production by some manufacturers, barely enough time is allowed after coating for the removal of solvents, and the balls are often dumped into bins before the surface has hardened. This procedure restricts the variety of materials that can be used in building the lacquer. A much better lacquer could be made if thorough drying or low temperature baking could be included in the finishing schedule.

Lacquering before Cure

Most of the causes of discoloration and poor adhesion as mentioned in connection with the molded goods field apply here also. There are many other disturbing factors when lacquer is applied before cure, such as certain types of accelerators and antioxidants. Some types of lacquer retard or even spoil the cure of the rubber. For these reasons both the producer of the lacquer and the rubber manufacturer should consolidate their efforts to insure the rubber and the lacquer being suitable for each other.

A few general statements might be in order at this point. Except in the case of blacks or very dark colors where a certain amount of discoloration is not noticeable, antioxidants or accelerators which cause discoloration of the lacquer should be omitted if at all possible. Softeners should be reduced to a minimum. Certain fillers promote adhesion of lacquer to uncured rubber better than others, and preliminary experiments should be made with the various compounds. Some stiffeners tend to make the rubber compound crack and also retard the cure when lacquer is used.

Latex rubber by nature contains some water soluble salts which affect the lacquer and its adhesion and which should be leached out so far as is possible.

Quarterlining and Sock-lining

In the majority of cases this material is produced by spreading rubber cement on cloth and curing with sulphur chloride. To promote adhesion of the lacquer a priming coat is often applied. Either a water or alcohol shellac or some of the special primers may be followed by one or more coats of clear or pigmented lacquer. Often the pigmented lacquer coats are top-coated with a clear lacquer to produce high gloss and a very dry finish. Also there are emulsion primers which, while considerably more expensive, produce even better adhesion and do not appear to discolor.

Leatherette and Raincoat Fabrics

These fabrics require the correct luster, good adhesion, water resistance, and resistance to marking. The last is most important and requires a sufficient amount of a correctly formulated lacquer film. Often a very thin coat will allow marking; whereas a heavier coat will eliminate this tendency. Rubberized and lacquered fabric for use on baby carriage tops must have good flexibility characteristics and very excellent durability under outdoor exposure. Because of the necessary folding of this material in service there is a great tendency for the lacquer film to crack or craze, but this must be overcome through proper compounding as an unbroken lacquer film is necessary to protect the rubber from exposure.

Cushion and Upholstery Materials

This group has a great many specific requirements, and special care must be taken both in rubber compounding and lacquer formulation. The rubber must be quite hard and not have too much stretch. It should be able to withstand severe flexing on the corners of the seat where the rubber is doubled over, and have good adhesion to the fabrics. If properly constructed, rubber covered cloth coated with lacquer will have high resistance to flexing and wear by abrasion and will outlast pyroxylin coated cloth. At the corner of the cushion where the double fold occurs, the pyroxylin coatings crack very soon and separate from the cloth quite readily. This is particularly true in cold weather. At this point in a truck cushion there is a tremendous amount of flexing. The lacquer coating must be hard on the surface, have the same stretch as the rubberized fabric, be very abrasive resisting, non-crocking, and have excellent adhesion to the rubber underneath.

There apparently is a wide divergence of rubber formulation for truck and other seat cushion material. Numerous samples of rubber compounds for this use have been submitted for lacquering. When the rubber was correctly formulated, the lacquered pieces of upholstery material showed very little failure when tested on a Wyzenbeek Wear-O-Meter at 50,000 or even 100,000 scrubs. On the other hand some rubber samples with the best lacquers would not withstand 2,000 scrubs on the Wyzenbeek Wear-O-Meter without bad crocking and rubbing off of the lacquer.

Glider materials are very similar to truck and other seat cushions except the colors used are usually much brighter and normally do not need to withstand as much weather and change in temperature especially when used indoors. The rubber should have a "tight cure" and should contain nothing which affects the lacquer as regards adhesion, discoloration, or crocking. In addition to qualifications listed above, the lacquer for glider materials must withstand both dry and wet abrasion without showing wear and without discoloring the fabric used in the abrasion test of many thousand scrubs.

Relative to the lacquering of rubberized fabrics, the abrasion resistance of the lacquer varies with the thickness of the lacquer coating. For this reason the rubber manufacturer must see that sufficient lacquer is applied and that all of the rubberized fabric is covered as uniformly as possible. A soup coat for two-tone color effect can be put on over the base lacquer either before curing, or after curing, with satisfactory results. If the soup coat is applied after cure, the product must be subjected to sufficient temperature to dry the lacquer thoroughly and remove all of the solvent. The soup coat is normally put into the bottom of the embossing, and therefore very little trouble is found in abrasion and crocking tests.

When embossing lacquered rubber, it is necessary to

run the embossing roll or plates at the lowest possible temperature at which a satisfactory embossing can be obtained. As the lacquer has not been cured with the rubber and therefore is in a somewhat thermoplastic condition, elevated temperatures have a tendency to cause the lacquer to stick to the embossing roll or plate. Little difficulty is encountered when embossing with rolls because, although the pressure is exceedingly high, the time of contact at high pressure is very short. Plate embossing is much more intricate because even though the contact pressure may not be any higher than with roll embossing, the length of time of contact is considerably longer and the lacquer very often adheres to the plate.

Rubber Footwear

Here again the rubber compounder should guard against harmful ingredients which tend to bleed. The primary objects of lacquering rubber overshoes are to give them the following characteristics: (a) good feel (minimize the rubber drag); (b) decorative effect (give a better finish or uniform dull color to simulate leather and eliminate marking); (c) minimum adherence of dirt during handling, or lint from the shipping carton; (d) prevention of rubber bloom; (e) prevention of ozone cracking prior to vulcanizing.

The lacquer should have excellent stretch and good snap-back so as to conform to the shoe in service. In the early days ordinary calendered rubber was vulcanized in a simple dry heat cure. The object of the lacquer was primarily to produce a shoe which did not feel too rubbery and had satisfactory stretch. In recent years the conditions have become more complicated owing to latex rubber, improvements in calendering, and the use of other types of cures such as the ammonia cure. Also progress demands lacquers which will meet much more severe requirements than formerly. Present footwear lacquers must not water-spot, become tacky in warm weather, or crack at extremely low temperatures, and they must provide good appearance, durability, and flexing qualities. In the old days great stretch was not required. The high overshoes usually had buttons or zippers which allowed the shoes to be well opened when the foot was inserted. With rubber footwear and especially the new type of imitation Russian boots which require stretching when pulled over the shoes, the lacquer must be tremendously more elastic. This characteristic is achieved best when an extremely thin film of lacquer is applied.

Rubber shoes, which are partly dull and partly high gloss finish, are usually finished somewhat as follows. First, a dull lacquer is sprayed on the part of the shoe which should be dull. Owing to the hundreds of shoe sizes and varieties, it is impossible to have stencils for accurate spraying. Because of this condition usually some of the dull lacquer falls on that part of the shoe which is to be given a high gloss lacquer to produce the two-tone effect. A fairly heavy coat of the correct type of gloss lacquer is applied to the part intended to be bright. Where the gloss lacquer overlaps the dull, it is necessary to apply a sufficient glossy coating to kill the dullness underneath. Therefore at this point there is a heavy coat of lacquer. As the unvarnished rubber normally has only a low gloss, a fairly heavy coat of high gloss lacquer is needed to simulate a patent leather finish. When the shoes are cured, cracking or crazing is probable on the high gloss part and particularly at the points of double coating. Sometimes the dull coat is put on before cure and the gloss coat after cure. This practice does not eliminate crazing at the points of double coating, but it does improve the gloss of the gloss lacquer. Baking or curing does what might be termed "take the edge off" the highest gloss.

A lacquer coat will eliminate any normal type of blooming. In some cases blooming, already visible, has been stopped by a coat of clear lacquer even after cure. There may be some phenomena, emanating from the rubber, which lacquer will not stop, but these are very rare.

Ozone cracking has been prevented and entirely eliminated by the application of lacquer as soon as possible after the formation of the shoe. Apparently as soon as it is applied, the lacquer prevents any serious action of ozone on the rubber, and curing may then be delayed.

Normally lacquers applied after cure do not produce as good adhesion and consequently not as good apparent stretch as is accomplished by before-cure lacquers on this type of goods and, therefore, are not as commercially satisfactory. From the manufacturer's viewpoint after-cure lacquers are more expensive because an added drying at a low temperature for a fairly short period is necessary.

Lacquer Formulation

In addition to pigments to impart color, lacquers for rubber coatings contain, generally speaking, three types of solid materials: namely, nitrocellulose for tensile strength and film forming qualities, plasticizer for stretch, and resin for adhesion. A great many resins aid the stretch, but normal resins particularly of the soft and flexible type give very little tensile strength.

All lacquers for rubber must not contain more than an extremely low fraction of 1% of copper or manganese because both are harmful to rubber; consequently the ingredients must be carefully selected. Some pigments as well as other lacquer ingredients contain small amounts of these materials, probably 1/1000 of 1%, originating as impurities in the raw materials or from brass valves or other parts of the manufacturing apparatus.

After-cure lacquers range from the old type of dope solution: namely, nitrocellulose and oil or chemical plasticizers, down to the very latest lacquers which are water white, contain no oil or so-called chemical plasticizers, and have very excellent stretch, adhesion, and rebound on stretching.

Resins

Many of the best resins for producing adhesion cannot be used in after-cure lacquers, at least in so far as the normal manufacturing schedule will permit, because they are usually of an oxidizing or polymerizing nature. Lacquers incorporating the oxidizing type of resins require considerable time to air dry, and during this drying period they are sticky, cannot be handled or packed, and have a tendency to pick up lint and dust from the air. The polymerizing type does not polymerize in after-cure lacquers unless the rubber article is actually given a second bake or cure.

In the normal type of dry heat cure a great assortment of oxidizing and polymerizing resins may be used. When tested, many of these show certain defects, but others give excellent adhesion and do not cause trouble with the rubber. Along with good adhesion some resins show considerable stretch of their own accord. Besides some resins give excellent outdoor weathering. In general resins used in before-cure rubber lacquers are partially oxidized and partially polymerized in the cure. It is usually true that resins which are called "oxidizing and non heat-polymerizing," or *vice versa,* actually do both in a rubber cure. In the normal type of dry heat cure, the elevated temperature tends to polymerize the resins to a certain extent. However some oxidation in the presence of the hot air is certain to occur. This also probably accounts for the different results secured with these resins when these lacquers are used in an ordinary type of curing chamber for

rubberized fabric, and the dry heat type of curing oven for rubber overshoe, where the air pressure is often under 30 pounds.

Resin-Type and Other Plasticizers

Chemical and certain oil plasticizers in lacquer have a tendency to soften or dissolve the rubber. This does not necessarily take place immediately, but this effect may show up later. In before-cure lacquers a wide choice of plasticizers and resins is available. The plasticizers generally used are of the so-called resin type which are non-oxidizing and non-heat polymerizing synthetics.

Solvents

From time to time there has been considerable discussion relative to the effect on the cured or uncured rubber of the solvents and non-solvents used in the complete lacquer formulation. Requests have been received for lacquers, the solvent portion of which must not contain any toluol, hydrocarbon solvents, or petroleum as "they have an effect on the rubber." However few commercial applications of lacquer have been seen where the hydrocarbon or petroleum solvents have had any effect on the rubber itself, except possibly in a favorable manner. The time of contact between the lacquer solvents and the rubber is so short that any great dissolving or softening action on the rubber seems impossible. It is believed that these solvents have a good "wetting" action on the rubber and therefore assist in securing adhesion of the lacquer to the rubber. It is, of course, true that these solvents may have a tendency to dissolve out of the rubber compound certain components such as bleeding pigments, waxes, softeners, and such types of materials. These components should be eliminated or changed in the rubber compound. However, other than this effect, nothing objectionable has been found in the solvents and non-solvents used in the normal lacquer formulation.

Pigments

The selection of pigments is very important, particularly in before-cure lacquers, and those used should have the following general qualifications: non-bleeding in lacquer solvent; non-crocking; particularly free of copper and manganese; unaffected by the rubber ingredients, especially sulphur; and capable of withstanding temperatures of 260° F. for two hours without appreciable discoloration or deterioration.

The addition of pigments in any considerable quantity affects the tensile strength and the adhesion of the lacquer film. This latter is due to the fact that the pigment particles will settle against the rubber surface and reduce the area of the binder portion of the lacquer in contact with the rubber.

One of the very beneficial effects of pigments in lacquer is that they produce better feel, particularly if the finish is not high gloss. The particles of pigment on the surface of the lacquer produce a type of dulling effect which makes the "feel" of the lacquer very dry and pleasing. Some "clear lacquers" are made dull or eggshell by means of certain types of flatting pigments. These so-called dull or flat clear lacquers have a very much better feel than a high gloss finish.

Continuity of Film

Much has been said of continuous and discontinuous films of lacquer on rubber articles. Just where to distinguish between these two is somewhat difficult. There is no question that excessive stretch on many rubber articles finished with lacquer will cause fine crazing of the lacquer, but if excellent adhesion is maintained, there is really nothing to worry about. Very often this crazing is so fine that it is not at all visible except under a glass.

It is very true that certain finishes craze. The so-called "hard finish" on the imitation leather used for hand bags is so hard that it is impossible to make a lacquer film sufficiently dry and hard to satisfy the requirements and still have any appreciable stretch. Fortunately in this particular type of work stretch is not very important, certainly not in comparison with the hardness and non-marking requirements of the film. All of this type of goods have fine crazing when stretched or bent, but this does not in any way make the material unsatisfactory for use.

In general the nitrocellulose lacquers have proved more satisfactory than the straight synthetics for a number of reasons. But it is believed that in the coming years it will be found that more and more synthetic resins will take their place along with nitrocellulose in this particular type of finish.

Census of Manufactures

(*Continued from page* 41)

TABLE 5 (*Continued*)

Crude Rubber Consumed, by Class of Products Made	1937	1935	1933
Rubber tires and inner tubes:			
Pneumatic casings	333,867	298,950	292,753
Inner tubes	51,450	45,856	
Solid and cushion	1,653	1,985	2,789
Boots and shoes	20,214	17,716	17,823
Rubber heels and soles, including slab soling	13,176	15,449	19,054
Rubberized fabrics and rubberized clothing (finished)	10,524‡	10,377	9,141
Mechanical rubber goods; rubber flooring; rubber mats and matting	56,422	39,325	27,708
Hard-rubber goods	3,660	4,556	2,197
Rubber thread, rubber cement, and rubber gloves	9,514	4,504	3,479
Tire sundries and repair materials, rebuilt or retreaded tires, including camelback	11,115	10,817	18,927¶
Other manufactures of rubber, including druggists' and medical sundries, balloons, stationers' rubber bands, erasers, golf and tennis balls, toys, and sponge-rubber products	19,374	19,913¶	

‡Bathing caps and bathing suits included with rubberized clothing for 1937.

¶ Bathing caps and bathing suits, and rebuilt or retreaded tires included in "Other manufactures of rubber," for 1935 and 1933.

TABLE 6. RUBBER CONSUMED IN THE RUBBER INDUSTRIES, BY STATES: 1937 AND 1935

[Ton, 2,240 pounds]

	Crude Rubber	Reclaimed Rubber: Purchased and Consumed	Reclaimed Rubber: Reclaimed and Consumed
United States:			
1937	531,091	100,509	55,576
1935	469,448	76,221	37,404
California:			
1937	59,322	*	*
1935	35,988	4,353	1,911
Connecticut:			
1937	15,655	1,171	*
1935	12,566	1,081	....
Illinois:			
1937	6,516	*	*
1935	5,239	5,770	*
Massachusetts:			
1937	36,166	7,161	8,612
1935	34,167	6,500	3,148
New Jersey:			
1937	16,200	8,326	*
1935	14,008	6,724	1,233
New York:			
1937	13,766	*	*
1935	7,695	1,093	*

* Withheld to avoid disclosing, exactly or approximately, consumption reported by individual establishments; included in figure for "Other States."

(*Continued on page* 47)

The Torsilastic Spring[1]

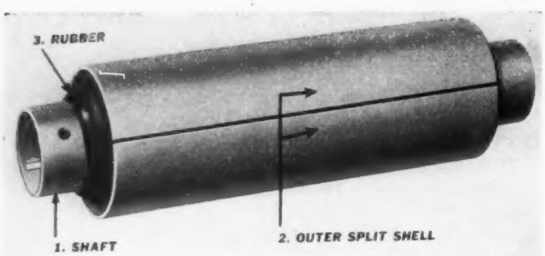


Fig. 1. The Torsilastic Spring

DESIGNED to supplant the conventional type of leaf or coil spring for transportation vehicles, the Torsilastic spring, which utilizes rubber in torsion, is now being considered for large-scale automobile production after more than four years of road tests. A wide range of requirements may be met by variation in design, size, and in the length of the lever arm which applies the torsional load.

Construction

The Torsilastic spring, as shown in Figure 1, comprises a steel inner shaft surrounded by an annular layer of rubber, and a metal shell around the outside. The cylinder of rubber is bonded to both shaft and shell. The outer shell is split into two 180° segments. The function of the split shell is three-fold: (1) to permit high pressures to be applied to the bond between rubber and metal during cure, thus obtaining satisfactory adhesion; (2) to permit the rubber to shrink, after cure, without causing internal tension; and (3) to permit placing the rubber and the rubber-to-metal bond under radial compression which improves the life of the bushing.

The rubber is stressed in torsion by anchoring either the shaft or the outside shell to the chassis and rotating the other member. The Torsilastic spring can be so applied in the chassis as to obtain the following advantages: (1) reduction in "harshness" of ride because of the slight flexibility in the rubber acting as a bearing; (2) lowered noise level as a result of the insulating properties of the rubber; (3) elimination of customary bearings, bearing parts, spring seats, and mountings; (4) reduction of static friction to a minimum because of elimination of bearings; (5) freedom from lubrication, rattles, and squeaks; (6) cleanliness and simplicity of design with low weight; (7) impossibility of sudden failure; (8) reduction of impact loads on suspension members as rubber forms its own bearing.

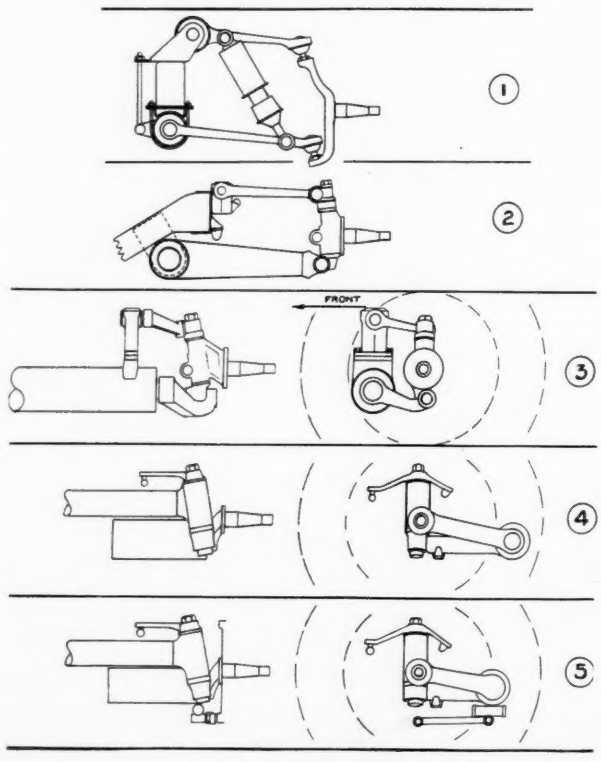


Fig. 2. Suspension Types: 1. Wishbone Type with Two Torsilastic Springs per Wheel and Balls Replacing King Pin; 2. Wishbone Type with One Torsilastic Spring per Wheel; 3. Longitudinal Arm Type with Moving King Pin; 4. Longitudinal Arm Type with Fixed King Pin and No Brake Reaction Arm; 5. Longitudinal Arm Type with Fixed King Pin and with Brake Reaction Arm

While the spring itself costs slightly more than a steel spring, comparisons should be made on the basis of a complete suspension assembly. The assembly shown in Figure 1 contains 3.3 pounds of rubber, a shaft weighing 3.69 pounds, and a split shell at 3.75 pounds, a total of 10.74 pounds, replacing a coil spring weighing 11.5 pounds. As compared with a steel spring, this weight rep-

Fig. 3. Torsilastic Springs Mounted on an Automobile

[1] The information in this article is taken from a paper on "Rubber Suspension" by A. S. Krotz, development engineer, B. F. Goodrich Co., Akron, O. The paper was presented on May 1, 1939, at a meeting of the Detroit Section of the Society of Automotive Engineers.

resents the spring itself, the spring seats and mountings, and the support arm bearings.

Application

Figure 2 indicates some of the possible suspension types for the Torsilastic spring: (1) wishbone-type front suspension using two rubber springs per wheel; (2) wishbone type using one rubber spring per wheel and taking brake reaction on the rubber bushing; (3) Mathis; (4) Vauxhall; (5) Opel Dubonnet. There are many other ways of applying these springs to automobile chassis and to railroad and street car suspension. Figure 3 shows an automobile equipped with Torsilastic springs.

Rubber springs should be particularly effective on models where good distribution of mass permits the use of relatively low spring rates without recourse to tight shock absorber control. It may be assumed that static loaded deflection will be from seven to twelve inches. From the proposed layout the length of effective arm from the rubber springs to the steering knuckle can be determined. In general the tendency will be toward shorter wheel support arms than used for steel springs. With arm length and static spring load and static deflection determined, the loaded moment and torsional rate of the spring are fixed.

Design

The bushing may be long and slender or short and thick, depending on such chassis considerations as clearances and the amount of flexibility desired. The spring shown in Figure 1 is typical of a design for the front suspension of a 3,400-pound car and for all practical purposes is a constant rate spring throughout the range useful in suspension. For large strokes the damping effect of hysteresis becomes noticeable, but for short strokes shock absorbers are needed to attain the standard of ride expected by the buying public in this country.

In regard to tilting and to axial displacement, the slight elasticity shown by the spring in this respect is advantageous in reducing harshness of ride. The degree of creep in this type of spring as applied to test cars is found to be small. In most cases it seems best to keep the size of the spring down and take a slight amount of creep, and provide a simple adjustment which need not be serviced more than once a year under normal conditions.

Any required laboratory fatigue life may be obtained with Torsilastic springs, and accelerated laboratory tests as well as road tests have been used in establishing basic design limitations which will give spring life equivalent to maximum car life without wasting material. Any deterioration at the exposed ends of the rubber bushing has been found to have a negligible effect on spring life, and it has not been found necessary to use a shield of any kind. The aging of the body of rubber is extremely slow and requires longer than the total life of the car to make any appreciable change.

Rubber Compound Requirements

A wide range of rubber parts, including these torsion springs and many other springs and mountings, requires rubber compounds which are very similar except for the degree of elasticity. That is, the compounds used for these purposes may vary in hardness, but must have low permanent set and high fatigue life under comparable stresses, together with good aging characteristics and other more technical requirements. It is not necessary that all compounds of such a series bond easily to metal parts, as a tie gum can be used for that purpose.

The objectionable effect of softening agents on rubber limits the range of acceptable stocks on the soft side. At the present state of development a compound of pure gum stock containing only the essential ingredients for a satisfactory cure will probably be between 40 and 45 Shore Durometer hardness; while the hardest stock that can be used effectively will be approximately 60 Durometer. If a series of compounds is tested for creep and for fatigue life at the same unit stress, the soft rubber deforms more than the hard rubber and stores more energy per unit volume and therefore is at a disadvantage. Conversely if all compounds are tested over the same range of deformation, the hard compound is placed under higher unit stress, and it, in turn, is at a disadvantage.

By applying coordinated tests a series of stocks acceptable for many forms of rubber springs and mountings can be developed. These stocks will not all have the same characteristics of fatigue life, creep, and the other tests applied. In many cases the designer will be willing to sacrifice one or more characteristics to obtain a stock with some preferred hardness or some other particular qualification.

Census of Manufactures

(*Continued from page* 45)

TABLE 6 (*Continued*)

[Ton, 2,240 pounds]

	Crude Rubber	Reclaimed Rubber: Purchased and Consumed	Reclaimed Rubber: Reclaimed and Consumed
United States (*Continued*)			
Ohio:			
1937	220,186	32,950	28,892
1935	249,821	23,353	26,988
Pennsylvania:			
1937	18,693	4,351	*
1935	12,471	2,036	......
Rhode Island:			
1937	5,699	*	*
1935	5,099	679	......
Indiana, Kentucky, Michigan, Minnesota, Missouri, Wisconsin 1937†	107,592	25,666	*
Indiana, Kentucky, Michigan, Minnesota, Missouri, Wisconsin 1935†	76,659	20,750	......
Other States:†			
1937‡	31,296	20,884¶	18,072¶
1935	15,735	3,882	4,124¶

† Figures combined to avoid disclosing, exactly or approximately, consumption reported by individual establishments.

‡ Alabama, Colorado, Delaware, Georgia, Iowa, Maine, Maryland, Nebraska, North Carolina, Oregon, South Carolina, Tennessee, Texas, Vermont, Virginia, and Washington.

¶ Includes data for states covered by footnote *.

TABLE 7. VALUE OF INVENTORIES OF MATERIALS AND FINISHED PRODUCTS, AND VALUE OF PRODUCTS: 1937

	The Industries as a Group	Rubber Tires and Inner Tubes	Rubber Boots and Shoes	Rubber Goods Other Than Tires and Inner Tubes and Boots and Shoes
Inventories:				
Beginning of year, total	$195,358,827	$147,392,990	$13,325,939	$34,639,898
Finished products	102,445,068	81,408,571	8,141,341	12,895,156
Materials, supplies, etc.	92,913,759	65,984,419	5,184,598	21,744,742
End of year, total	221,159,008	160,677,126	18,644,636	41,837,246
Finished products	123,725,802	93,914,676	13,097,732	16,713,394
Materials, supplies, etc.	97,433,206	66,762,450	5,546,904	25,123,852
Value of products for industry, total	883,032,546	575,860,262	64,455,332	242,716,952
Value for establishments reporting inventories (includes value of products of establishments reporting no inventories on hand)	877,668,473	575,860,262	64,455,332	237,352,879
Value for establishments not reporting inventories	5,364,073	....	....	5,364,073

Rubber Springs in Shear Loading[1]

J. F. Downie Smith[2]

THE designer in industry should be able to predetermine by calculation the size and hardness of, and the deflection to be expected from, a rubber spring which is to serve a special purpose. Unfortunately the literature contains little which would be of help, and it is the author's intention in this paper to supply such information for rubber springs loaded in shear. Most of the designs ordinarily encountered in practice have been considered.

The definition of strain is set up in engineering literature for small angles either as the tangent of the shear angle or as the angle itself. In the numerous samples tested by the author and in those cases noted in published experiments, the angular definition gives the better agreement between theory and practice. For that reason it is used as the basis of mathematical treatment in the paper.

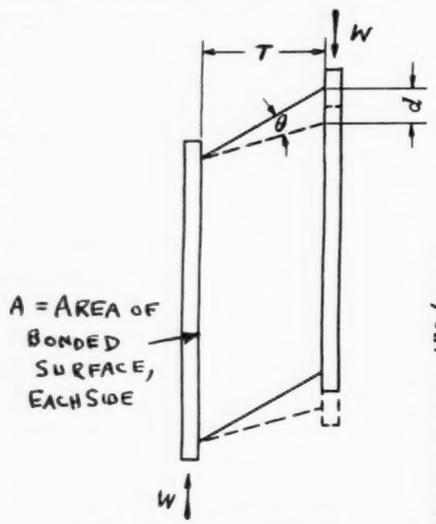


Fig. 1. Plain Shear Sandwich

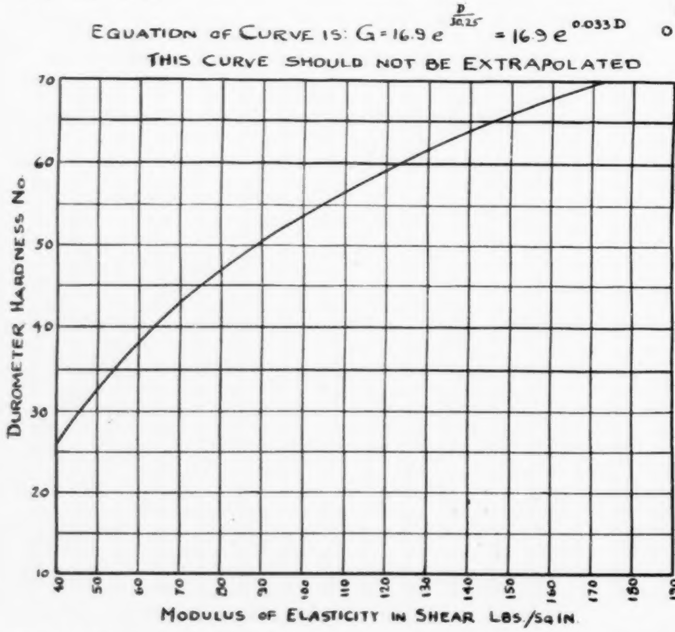


Fig. 2. Durometer Hardness Number vs. Modulus of Elasticity in Shear

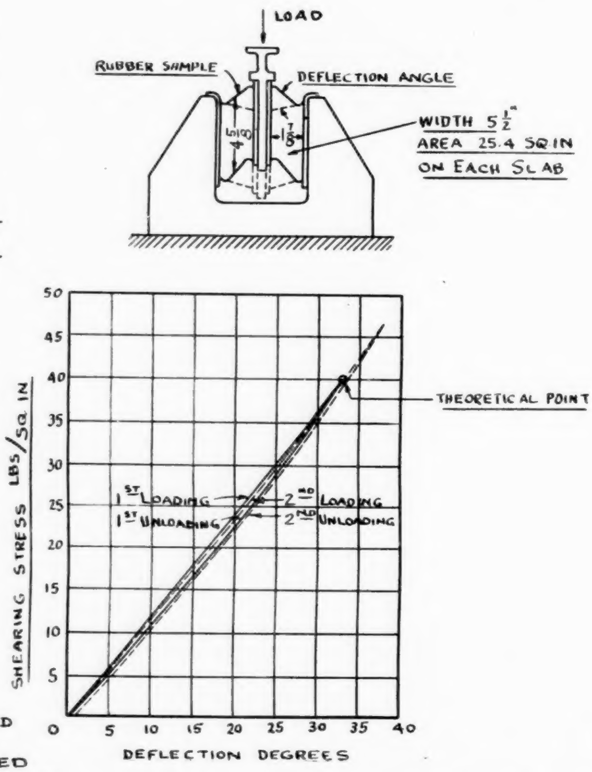


Fig. 3. Shearing Loading of Two Rubber Slabs—43 Durometer—Room Temperature 83° F.

The most common shear rubber spring is shown in Figure 1. In this simple case

$$\text{strain} = \theta \text{ (in radians)} = \frac{W}{AG}$$

$$\text{or } \theta \text{ (in degrees)} = 57.3 \frac{W}{AG}$$

where W is the applied force, A is the area of

[1] Abstracted from paper presented at June 15 national meeting at Columbia University of Applied Mechanics Division of American Society of Mechanical Engineers through the co-operation of the Subdivision on Rubber and Plastics of the Process Industries Division. The complete paper, soon to be published in *Journal of Applied Mechanics, A.S.M.E. Transactions*, should be consulted for cases and details not given in the abstracted form.

[2] Executive engineer of research and development, E. G. Budd Mfg. Co., Philadelphia, Pa.

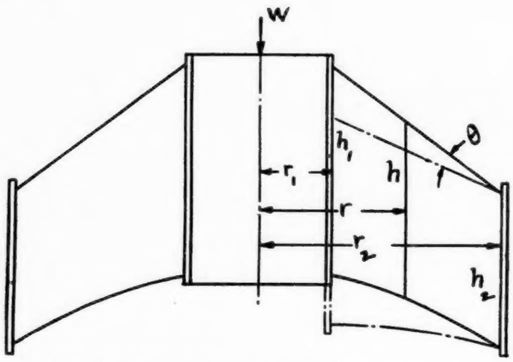


Fig. 4. Cylindrical Shear Bushing —Constant Stress

the instrument is so far from being standardized that cross checking is necessary.

Equation 1 applies equally well to double shear springs if it is realized that the area A to be substituted in the equation is twice the area of one side. Figure 3 shows confirmation of the theory in the characteristics of a particular spring.

Cylindrical bushings for axial loading in shear can be designed in many ways. If they are designed for constant stress in the rubber, the design is mathematically equivalent to the flat shear type of spring. To satisfy equation 1 it is only necessary that the cylindrical area for every value of the radius be the same. That is for Figure 4, $A = 2\pi\, r_1\, h_1 = 2\pi\, rh = 2\pi\, r_2\, h_2$. Then if this value of A is substituted in equation 1 the deflection and angular strain may be found for any given load.

A simple torsion spring is shown in Figure 5. In this case the bonded surface on each side, and G is the shear modulus.

From equation 1 it is possible to calculate the strain or deflection provided the physical dimensions of the rubber, the load, and the modulus of elasticity of the rubber in shear are known. The shear modulus may be found quite reliably from Figure 2 if the Durometer hardness is known. Unfortunately it is difficult at present to get two Durometers picked at random which agree perfectly so that for each Durometer a curve such as shown in Figure 2 is necessary for accurate work. It is regrettable that

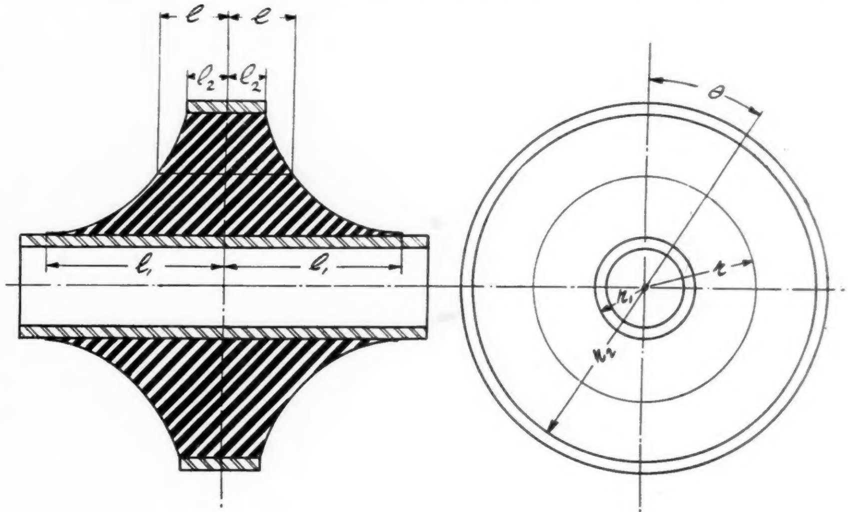


Fig. 6. Torsion Spring—Constant Stress

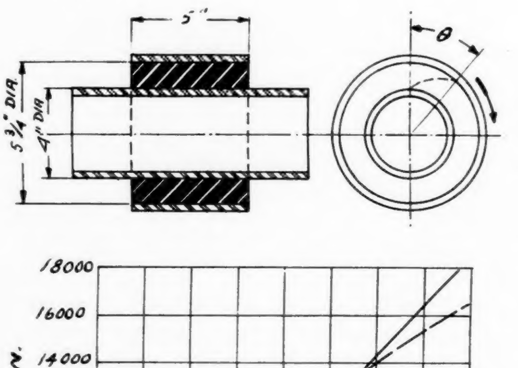


Fig. 5. Torsion Spring—Constant Length—45 Durometer Rubber—Room Temperature 70° F.

rubber element is of constant length. The equation for the angular deflection θ of this type, when subjected to a torque T, is

$$\theta \text{ (in degrees)} = \frac{4.55\,T}{l\,G}\left[\left(\frac{1}{r_1^2}-\frac{1}{r_2^2}\right)+\frac{1}{9}\left(\frac{T}{2\pi\, l\, G}\right)^2\left(\frac{1}{r_1^6}-\frac{1}{r_2^6}\right)+\,..\right] \quad (2)$$

where l is the length of the rubber r_1 and r_2 are the inside and outside radii respectively, and G is the modulus of elasticity in shear as before. The graph shows theoretical and experimental results.

For the torsion spring employing constant stress, Figure 6, rather than constant length of rubber, the equation is

$$\theta \text{ (in degrees)} = 132 \log_{10}\left(\frac{r_2}{r_1}\right) \tan\left(\frac{T}{4\pi\, G\, r_2^2\, l_2}\right) \quad (3)$$

where l_2 is the outside length at the radius r_2.

Railroads Operate More Trucks Than Locomotives

During the past decade the railroads have extended directly their transportation facilities over the highways to such an extent that they now have more trucks than locomotives in operation. In 1937 the railroads were using 53,162 trucks in moving freight over the public highways, as compared to 47,555 locomotives that were operating on their privately-owned rights of way. *American Petroleum Institute.*

Editorials

Dissemination of Facts Regarding Rubber

On PAGE 37 appear ten suggestions for promoting rubber furnishing sales which were published in the June issue of "Rubber and Latex in Furnishing & Decoration," a British publication. These sales suggestions accentuate the lack of appreciation by the general public of the fact that "rubber," as purchased by the ultimate consumer, is not a single material used for all purposes, but rather a large class of materials wherein through compounding practice and manufacturing processes rubber articles can be made to have widely divergent characteristics. Rubber bearings, when lubricated with water, have a very low friction coefficient, but rubber tires can be made with high anti-skid qualities. Rubberized balloon fabric retains gases, but sponge rubber mattresses and upholstery materials permit a circulation of air through the breathing action produced by a shifting load.

Certain fallacies regarding "rubber" in specific applications have become deeply embedded in the minds of the general public with the result that rubber products in general are often regarded as possessing the same characteristics. In many instances these suppositions erroneously result in a negative appeal for the article.

Exposition of the facts regarding the possibility of altering and controlling, during processing, the attributes of rubber has a pronounced tendency to clear up some of the false impressions. The general acceptance of rubber products for new uses can be expedited by provision for informing the public as to the real situation. In England certain general organizations which are associated with the rubber industry have been very active in informing the public regarding the true characteristics and usefulness of the diversified rubber products. In the United States the principal avenue of approach has been through the salesman. In the case of rubber products used in industry this can be quite effectively accomplished as present-day salesmen of such products are in general well informed. When merchandising household and similar rubber products through department or other retail stores, it is reasonable to expect that the salesman or saleslady will not be so well informed and accordingly not able to dispel any misapprehensions existing in the minds of the buying public. Logically it appears that the fullest popularization of such rubber products will be dependent upon the efforts of the producers individually or collectively toward the creation of a true understanding of the merits of these goods. The importance of an educational program, directed toward the public and the immediate contacting sales people, should not be underestimated as a force in promoting a wider acceptance of rubber.

Rubber Quota

At THE meeting held on July 25 in London, the International Rubber Regulation Committee voted for the third and fourth quarters of this year an increase of 5% in the permissible rubber exports, thus authorizing shipments equal to 60% of the basic quota. At the meeting on May 16 the figure for the third quarter was set at 55%, but the action on July 25 makes retroactive to July 1, 1939, the 60% allowable exports. The regulation committee provisionally decided to meet early in September if in the meantime the British government requests a release of rubber in connection with the barter agreement with the United States government.

This increase is apparently intended only for current consumption, and since the effect of actual shipments to compensate for the third quarter increase will probably not be felt before some time in September, the greater portion of this total increase will be realized during the fourth quarter.

The total amount does not appear sufficient to appreciably increase United States stocks, but rather to act as compensation for larger expected consumption. According to figures released by The Rubber Manufacturers Association, Inc., on July 25, tire shipments in the United States during June were the highest for any single month since June, 1933, and resulted in an inventory decrease of about one million casings during June. Reported total shipments of casings in June, 1939, were 5,733,216 compared with 4,753,403 in May, 1939, and 3,928,590 in June, 1938. Shipments during the first six months were approximately 50% greater in 1939 than in 1938. The prospects for original equipment sales indicate an exceptional tire production and heavy crude consumption this Fall.

Because of the time required to arrange details for the exchange of cotton and rubber and reach an agreement regarding the grades desired and the rubber producing territories to benefit, it appears improbable that rubber shipments under the barter plan, which will require approximately 10% for six months, can be well under way before late this year. Although this present increase in rubber exports may appear generous, decreasing rubber stocks and prospects for greater consumption indicate a need of close attention and a readiness to take quick action, regardless of the barter plan, so as to prevent an unstable rubber supply.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

Active A. S. T. M. Meeting Held

THE forty-second annual meeting of the American Society for Testing Materials held in Atlantic City, N. J., June 26 to 30, was a noteworthy one with more standards acted upon than at any previous meeting and with a registered attendance of 1,354.

Activity by Committee D-11 during the past year was revealed by the report of the chairman, O. M. Hayden, E. I. du Pont de Nemours & Co., Inc. Announcement was made of the organization under Committee D-11 of Technical Committee A on Automotive Rubber Products.

NEW TENTATIVE STANDARDS. Three proposed standards were accepted as tentative, covering rubber sheath compound for electric cords and cables, test for indentation hardness of rubber by means of the Pusey & Jones plastometer, and methods of testing hard rubber products.

The need of specifications for rubber sheath compound for use on cords and cables has been recognized, but this work has been retarded because of difficulty in finding suitable tests to measure resistance of the rubber sheath to abrasion and tearing. These specifications include requirements covering age deterioration and resistance to tear, but the question of resistance to abrasion has been omitted for the present.

The Pusey & Jones method is very generally in use in the paper industry in connection with rubber-covered rolls and similar products and has also found wide application in other fields. This tentative method has been prepared to provide a standard procedure for use of the Pusey & Jones plastometer in measuring the indentation hardness of vulcanized rubber compounds. The use of the term "hardness" has purposely been avoided to prevent confusion with the present Standard Method of Test for Hardness of Rubber (D 314).

"Hard Rubber" products, as covered in the tentative standards, is understood to refer to vulcanized rubber compositions having a ratio of combined sulphur to rubber hydrocarbon in excess of 15%.

ADOPTION OF TENTATIVE STANDARDS AS STANDARD. Three existing tentative standards were recommended by Committee D-11 for adoption as standard: Sample Preparation for Physical Testing of Rubber Products (D 15); Test for Adhesion of Vulcanized Rubber (friction test) (D 413); and Test for Adhesion of Vulcanized Rubber to Metal (D 429).

SUB-COMMITTEE ACTIVITIES. Sub-committee VI has prepared an extensive outline of various classes of packings and gaskets as a guide for future sub-committee activities. A survey is being conducted by Sub-committee X to secure laboratory data on possible improvements in the Methods of Tension Testing of Vulcanized Rubber (D 412) and to arrive at possible revisions covering the interpretation of results of tension tests.

Completing its investigation of recommended methods for the determination of small amounts of manganese and copper in rubber, Sub-committee XI has found that the analytical data from various laboratories varied as much as 500% on manganese and 100% on copper. With present available methods inadequate, a further study will be made.

Results of a study on the Method for Air Pressure Heat Test for Vulcanized Rubber (D 454) have brought forth the following conclusions by Sub-committee XV: that method D 454 provides a satisfactory life test for rubber under conditions specified; that different laboratories can reproduce results within reasonable limits; and that no further refinement on apparatus is required at this time. This sub-committee is organizing two new sections, one on development of kinetic aging tests under artificial light, and the other on interpretation of test data. Sub-committee XVIII is preparing new methods for the evaluation of rubber compounds with respect to deterioration from heat produced by hysteresis in rapid cyclic compression flexing.

TECHNICAL PAPERS. Two papers were presented by F. L. Yerzley, E. I. du Pont de Nemours & Co., Inc., entitled, "A New Oscillograph for Routine Tests of Rubber and Rubber-Like Materials"[1] and "Properties of Rubber Revealed by Mechanical Tests." In the latter paper Dr. Yerzley mentions that some tests are intended to measure not one, but a group of physical properties associated in a particular application. The tests conceivably throw considerable light upon the usefulness of rubber in that application and lead to marked improvements of performance by changes in compounds and mechanical design. While such a test performs preeminently well for that service, there is danger that if the connection is not clearly conceived, too much may be expected from it with respect to some other service.

In conjunction with the meeting there was sponsored the Fifth Exhibit of Testing Apparatus and Related Equipment, with a large number of new items displayed for the first time. Among the exhibitors were: American Instrument Co.; Baldwin-Southwark Corp.; Brabender Corp.; Federal Products Corp.; and Henry L. Scott Co.

[1] See our July, 1939, issue, pp. 43-47.

New Committee on Automotive Rubber

AT A meeting held in Detroit on June 8 there was organized a new group to function under the A.S.T.M. Committee on Rubber Products, to be designated Technical Committee A on Automotive Rubber. L. A. Danse, metallurgist, Cadillac Motor Car Division, General Motors Corp., was elected chairman of the technical committee, and J. D. Morron, manager, Motor Products Division, United States Rubber Co., secretary.

A. G. Herreshoff, chief research engineer, Chrysler Corp., outlined the purpose of the meeting and emphasized the importance of the work. After considerable discussion it was decided to limit the activities of the committee for the present to rubber used in motor mountings. A section was appointed by the chairman to correlate data, obtained from the various rubber companies, on the physical properties of rubber compounds now being supplied to the automotive industry to meet the various motor mounting specifications. It was thought that an analysis of these data might show that some degree of standardization already exists, or, if not, the information might lead toward desirable standardization.

Another section was authorized in the automotive industry to investigate test methods at present incorporated in motor mounting specifications so that the committee may be informed as to significant differences used by various companies in evaluating the same property. This is expected to assist in evaluating the physical test data accumulated by the first section.

Present members of the committee include 12 from the rubber industry and 14 from the automotive industry, including representation by the Society of Automotive Engineers.

A. C. S. Rubber Division Activities

Boston Rubber Centennial[1]

FOR the meeting of the Rubber Division, A.C.S., to be held in Boston, Mass., September 13 to 15, sufficient papers have been received to insure that in addition to the general anniversary meetings on September 13, the technical sessions will extend over two full days, September 14 and 15.

The banquet of the Rubber Division on September 13 will be open to all American Chemical Society members as well as members of the Rubber Division. The banquet, to be held at the Copley Plaza Hotel, will climax a special centenary day, an important event of the ninety-eighth A.C.S. meeting.

Dress for the banquet will be formal (Tuxedo), and ladies are invited to attend. The tables will be numbered and will seat ten, each ticket specifying a definite table. Applications will be filled in the order in which they are received; 900 seats are available, and no more can be added. Suitable souvenirs of the occasion will be given to all those attending. The price of banquet tickets is $5, and they may be obtained by sending the money to Everett Morss, Treasurer, Centennial Meeting, Simplex Wire & Cable Co., Cambridge, Mass.

Boston Group

ON FRIDAY, July 14, the Boston Group, Rubber Division, A.C.S., held its annual outing at the Weston Golf Club, Weston, Mass. The 167 who attended the affair enjoyed a day of varied sporting activities followed by an excellent chicken or lobster dinner in the evening. A committee, comprising G. W. Smith, R. J. Noble, and J. T. Blake, was named at the outing to nominate officers to be voted upon at the fall meeting of the group in November.

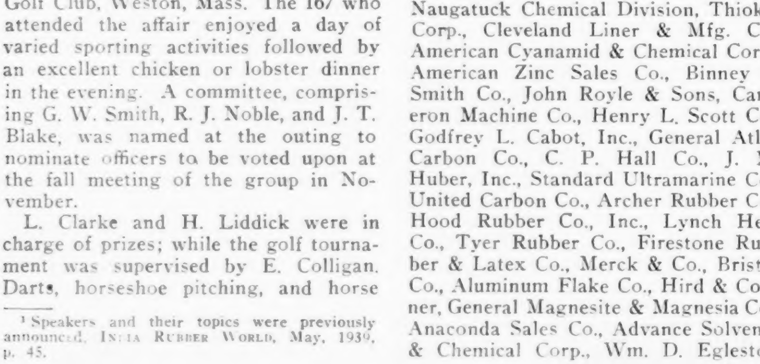
L. Clarke and H. Liddick were in charge of prizes; while the golf tournament was supervised by E. Colligan. Darts, horseshoe pitching, and horse racing were conducted by W. C. Weller, D. D. Wright, and R. Huber, respectively. A doubles tennis match drew a large crowd of spectators.

Winners in the golf tournament were: low gross (guests)—T. Newman, 72; low gross (members)—F. F. Salamon, 76; J. Mason, 79; E. Rupert, 79; W. Fisher, 80, and E. Colligan, 80; high gross—H. Atwater, 165; low net—L. Miller, 59; W. C. Weller, 64; R. H. Blanchard, 65, and J. C. Walton, 65; kickers' handicap—D. W. Ross, A. J. Puschin, A. Perry, F. Ward, F. Downes, and E. L. Hanna tied at 75; most 5's—E. Colligan; most 7's—P. Harriman; most 8's—R. Grant; closest three to the pin on 11th hole—C. Whiteside, W. H. Fish, and J. Mulligan.

Following dinner in the evening E. H. Krismann, group chairman, and J. C. Walton, secretary-treasurer, distributed a large number of attractive prizes to the winners of the various sporting events and holders of lucky tickets. These prizes were made available through the generous donations of the following concerns:

Atlantic Refining Co., Bryant Electric Co., Carter Bell Mfg. Co., Colonial Beacon Oil Co., Doe & Ingalls, Inc., Krebs Pigment & Color Corp., Monsanto Chemical Co., H. Muehlstein & Co., Inc., Oakite Products Co., A. Schrader's Son, Schofield Donald Co., A. Schulman, Inc., Vansul, Inc., Wishnick Tumpeer, Inc., Xylos Rubber Co., Naugatuck Chemical Division, Thiokol Corp., Cleveland Liner & Mfg. Co., American Cyanamid & Chemical Corp., American Zinc Sales Co., Binney & Smith Co., John Royle & Sons, Cameron Machine Co., Henry L. Scott Co., Godfrey L. Cabot, Inc., General Atlas Carbon Co., C. P. Hall Co., J. M. Huber, Inc., Standard Ultramarine Co., United Carbon Co., Archer Rubber Co., Hood Rubber Co., Inc., Lynch Heel Co., Tyer Rubber Co., Firestone Rubber & Latex Co., Merck & Co., Bristol Co., Aluminum Flake Co., Hird & Conner, General Magnesite & Magnesia Co., Anaconda Sales Co., Advance Solvents & Chemical Corp., Wm. D. Egleston Co., Southeastern Clay Co., Brooklyn Color Works, Inc., Pequanoc Rubber Co., R. T. Vanderbilt Co., Stamford Rubber Supply Co., Barrett Co., S. L. Ayres, Claremont Waste Mfg. Co., L. G. Whittemore, Wesco Waterpaints, Ernest Jacoby & Co., New Jersey Zinc Sales Co., Continental Carbon Co., Weller Chemical Co., Imperial Paper & Color Corp., Merrimac Chemical Division, Stanley Chemical Co., Grasselli Chemical Division, Plymouth Rubber Co., Davidson Rubber Co., Panther-Panco Rubber Co., Inc., Fisk Rubber Corp., Hodgman Rubber Co., Brener & Co., Walworth Co., Maintenance Supply Co., Wamsutra Mills, Inc., Stewart Bolling & Co., Inc., L. Albert & Son, Taylor Ins. Cos., A. C. Nispel, Shell Union Oil Co., Standard Oil Co., Sonoco Products Co., American Thread Co., Reichard Coulston, Raymond Chemical Co., Webster Cement Co., Boston Woven Hose & Rubber Co., Titanium Pigment Corp., Stedfast Rubber Co., Inc., Plymouth Cordage Co., E. I. du Pont de Nemours & Co., Inc., Gulf Refining Co.

[1] Speakers and their topics were previously announced, INDIA RUBBER WORLD, May, 1939, p. 45.



Boston Outing Photos Taken by George W. Smith

Los Angeles Group

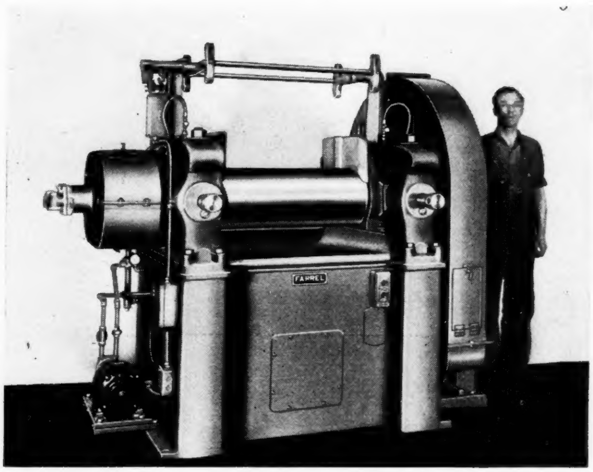
THE fourth annual fishing trip of the Los Angeles Group, Rubber Division, A.C.S., will be held on August 11 and 12 at Catalina Island. Members participating will meet at the California Yacht Club, Wilmington, Calif., at 6 p.m. on Friday evening, August 11. After dinner at the clubhouse the boat will pick up the party and sail for Catalina where members may disembark for the evening. Sleeping accommodations will include 22 berths on the ship and other provisions ashore. Berths will go to those making early reservations. The boat will proceed to the fishing grounds early Saturday morning, returning the same day in the late afternoon.

As the party is being limited to 40, members are urged to make their reservations early. Cost of the trip is $5 which covers everything. Checks for reservations should be sent to W. C. Holmes, program chairman, 1011 South Flower St., Los Angeles, Calif. Checks should be made payable to W. J. Haney, group treasurer.

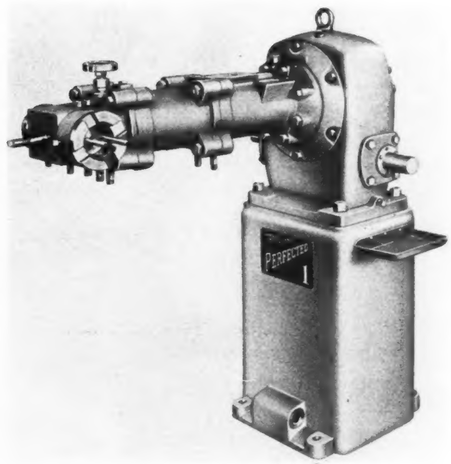
Chicago Group

THE Chicago Group, Rubber Division, A.C.S., is revising its mailing list and eliminating those people who did not ask to have their names retained. Any person who desires to receive notices of this group's meetings and who has not sent back a form properly filled out should communicate at once with the group secretary, B. W. Lewis, c/o Wishnick-Tumpeer, Inc., Tribune Tower, Chicago, Ill., sending complete information as to name, address, firm name, and firm connection.

New Machines and Appliances



Compact Two-Roll Mill



Royle Extruder with Resin Die Head

Space Saving Mill

A NEW 12- by 30-inch mill for processing rubber and plastics stocks has its motor and drive housed inside the base. Consequently the mill occupies far less floor space than the ordinary type of mill which has the motor and drive mounted in line at one end and on the same level. This self-contained feature also permits free access to the mill on all sides. The welded steel base, of the proper working height for safe and convenient operation, is heat-treated to relieve stresses which may have developed during fabrication.

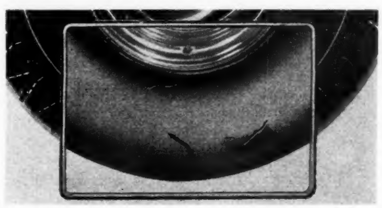
The mill also features the use of flood lubrication by a continuous circulating system to the full circle, bronze-lined journal boxes which are equipped with seals to prevent oil leakage. An oil sump tank is built as an integral part of the mill base. The oil flows, by gravity, to the motor-driven pump mounted on the side of the base and is pumped to the four journals, after which it returns by gravity to the pump.

The mill is driven by a 30 h.p. gear-motor with an output speed of 150 r.p.m. The drive gear is of Meehanite, and the drive pinion and connecting gears are of steel, all having machine-cut teeth. The gears are enclosed in sheet metal guards and run in an oil bath. The rolls are of chilled iron, fitted with Johnson joints for steam or water circulation. Guides are of the self-adjusting type, and safety rods over the rolls operate a brake on the motor for quick stopping in an emergency. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Extruder for Plastics

FOR the extrusion of resin or plastics compounds an extruder similar to that used for rubber is equipped with a newly developed resin die head which is a self-supporting member where the plastic material, having been brought forward through the cylinder by the feed screw, is forced through the forming die. In this head adequate passages for the circulation of hot oil have been incorporated, and the die-holder is cored to allow temperature control at the mouth of the die. For use with the resin head, a special jacketed cylinder extension and correspondingly longer feed screw are available to provide a longer compression and heating period for the compound. In covering wire or other forms, the form is introduced into the head at right angles to the cylinder, passing through the head and emerging from the die at the opposite side.

Successfully used in the production of resin-covered wire, the new resin die head is expected to extend its usefulness to the continuous extrusion of rods, tubes, channels, and other solid or hollow forms. John Royle & Sons, Paterson, N. J.



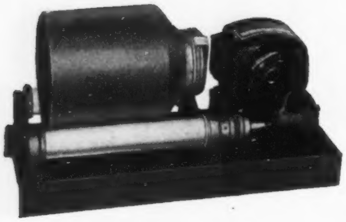
Section of Tire as Seen through the X-Ray Machine, Showing Nails, Cord Breaks, and Pieces of Glass and Rock

Technician Demonstrating Tire X-Ray to Leonard K. Firestone, Firestone Trade Sales Manager

Tire X-Ray

EXTENDING X-ray technique to the exposure of hidden tire hazards such as nails, broken cords, glass, and bruises, the Tire X-ray provides a quick means for determining the internal condition of a tire. To detect these hazards the automobile is elevated several inches above the floor, and the Tire X-ray is rolled under one wheel. Protective flaps confine the rays to the section under inspection. The wheel is rotated, and as foreign objects or defective cord sections are revealed, their position on the tire is indicated.

An experimental investigation of 2,000 worn tires produced 2,049 nails



Jar-Type Grinding Unit

and tacks, 2,099 pieces of glass, and 2,197 pieces of rock and small stones which had become lodged either in the tread or deeper in the body of the tire. In addition, a number of tires showed breaks in the cords and other types of defects. The Firestone Tire & Rubber Co.

Roller-Type Jar Mills for Latex Compounding

AN INEXPENSIVE grinding unit, the Roller-Type jar mill, provides a convenient means for the grinding and mixing of pigments, minerals, inks, colors, dyes, etc. Stoneware jars, tapered at one end to a 4¼-inch opening and with gasketed lids held in place by means of a patented clamp, are placed on motor-driven revolving rollers, which are of rubber-covered steel and mounted in brass bushed bearings. Standard sizes will accommodate one, two, three, or four jars, either of the 1, 1½, or 2-gallon size. The rollers are also useful for mixing the contents of bottles and other types of cylindrical containers. The motors are of the continuous-duty, geared-head type, the one- and two-jar units being equipped with a ¼ h.p. motor. The outside dimensions of the one-jar mill are 13 inches wide by 25 inches long; the two-jar mill is 13 inches wide by 42 inches long, each extra jar adding about 17 inches to the length.

Roller-Type jar mills were first successfully employed in the rubber industry for the grinding of pigments, carbon black, etc. and because of their adaptability are now being offered for other fields. United States Stoneware Co.

Laboratory Tire Skid Tester

A RECENTLY developed laboratory machine is said to determine for the first time the stopping qualities of automobile tires at speeds of from 20 to 60 miles per hour with greater accuracy than is possible with cars or trailer units on the road. Although tests are conducted inside the laboratory, provision is made to incorporate outdoor conditions such as air resistance and driver's reaction time.

The tire to be tested is mounted on a standard automobile wheel powered by an electric motor; while the axle is mounted on a beam which is pivoted at one end and heavily weighted on the other end. When the tire and wheel are rotating at the desired constant speed, a lever is thrown, and the wheel assembly drops to a road surface kept constantly wet by a spray of water. Simultaneously with the shutting off of the motor, a small counter wheel goes into action to record the linear distance that the tire travels or skids before it comes to a complete stop.

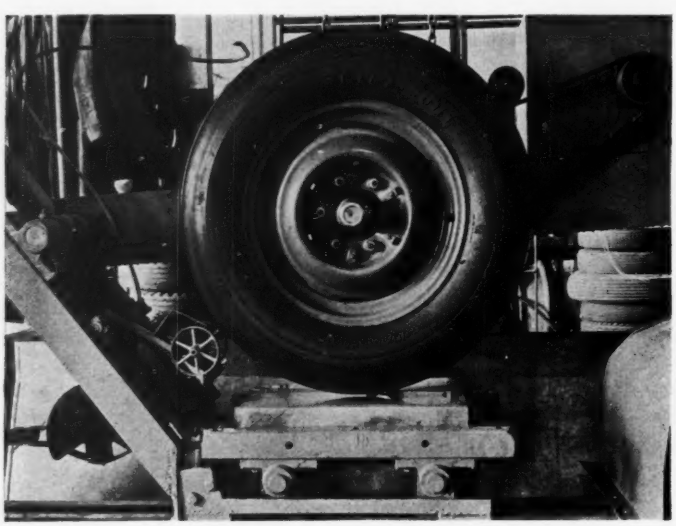
Contrary to the assumptions of previous investigators, 30 comparative tests on three types of concrete, an oiled wood block, and two types of asphalt showed that the friction coefficient of the tire tested does not necessarily drop uniformly with increased speed. On a certain type of asphalt the coefficient was found to be .64 at 10 m.p.h., dropping uniformly to .53 at 40 m.p.h., but rising again to .57 at 60 miles per hour. Rougher surfaces showed this same trend. On smooth surfaces, such as smooth concrete and oiled wood blocks, the coefficient of friction showed a uniform drop through the entire speed range. Some advantages claimed for the new tester are: elimination of the human element in applying braking force; uniform speed; wide speed range; use during test of maximum load and inflation pressure recommended by The Tire & Rim Association, Inc.; clean tire and road surfaces; constant temperature; and the ability to reproduce accurately test conditions for each tire. Fisk Tire Co.

Smooth-Cure Tire Vulcanizer

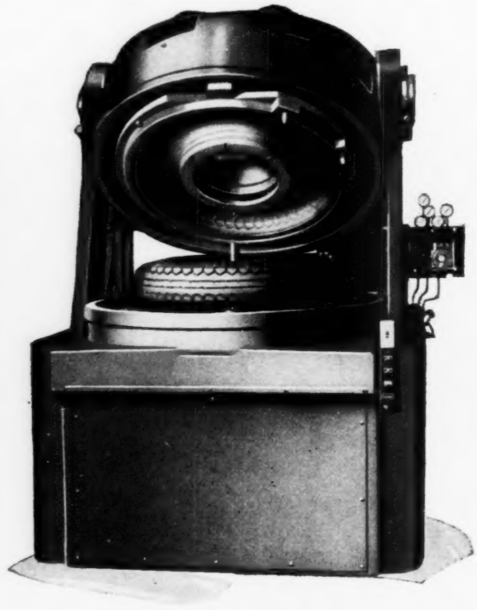
A NEW unit tire vulcanizer is so constructed that when it is closed, the mold is encased in an air-tight steam vessel. By means of a vacuum line, all air is removed from both the vessel and mold so that when pressure is exerted in the airbag and the steam turned on, a smooth cure is obtained. As the steam completely surrounds the mold at all points during vulcanization, "cold spots" are eliminated.

An individual electric motor opens and closes the vulcanizer; the motor is controlled by an electrical timing device. Air bag or hot water bag connections are automatically made, and the vulcanizer is fitted with an automatic tire ejecting ring.

Ordinary molds are used, eliminating the added expense of steam jacketed molds when changes of tire design are found necessary. Molds now being used in pot vulcanizers can be employed in the new vulcanizer, substantially increasing mold production. The Akron Standard Mold Co., Akron, O.



Fisk Tire Testing Machine



New Unit Tire Vulcanizer

New Goods and Specialties

Neoprene Household Gloves

EBONETTES, black household gloves, are made of Neoprene. They are said to be impervious to all types of liquids—oils, dry cleaners, varnish removers, or caustics and to be unaffected by high temperatures and sunlight. Each pair has a six-month guarantee. Pioneer Rubber Co.

Table Demonstrator

A THREE-PIECE molded rubber table demonstrator is used in displaying the advantages of an improved vault base. One section represents a piece of earth with the deep-cut impression of the ordinary narrow-rim base and with the slight impression of the new non-embedding base. Silver-colored scale models of the two different types of bases fit in place over the impressions. The demonstrators are made by the Perfect Rubber Co. for the Galion Metallic Vault Co.

Rubber-Cushioned Skate

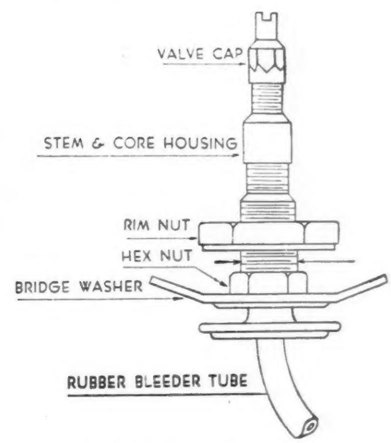
THE Globe 95, a new professional rink skate, features a shock absorber construction on the knee-action principle, comprising an adjustable tension

Globe Rink Skate

bolt and a 7/8-inch cylindrical rubber cushion to absorb shocks. Hard rubber composition, mar-proof wheels are also provided. Globe-Union, Inc.

Oxy-Jet Aerator

THE Oxy-Jet Aerator, made of rubber, is a two-piece spray unit for attachment to faucets in the kitchen and bathroom. Water flows through the nozzle, drawing air in through the vents on the sides. Subsequent passage through a series of fine mesh screens mixes air and water and removes particles. As the water leaves the nozzle, it is smooth flowing, without a splash.



Goodrich Farm Tire Valve

Millions of air bubbles make the water soft to touch, and, as the stream hits the sink, it spreads smoothly, the air bubbles acting as an impact cushion.

The aerated water is said to provide more efficient washing and to lather quickly, giving more suds from less soap. In addition, rinsing becomes easier. The Aerator is said to help counteract the effect of minerals and chlorine, and the aerated water is fresh and sparkling to the taste. If desired, the nozzle cap may be removed to give a hard, forceful stream of water.

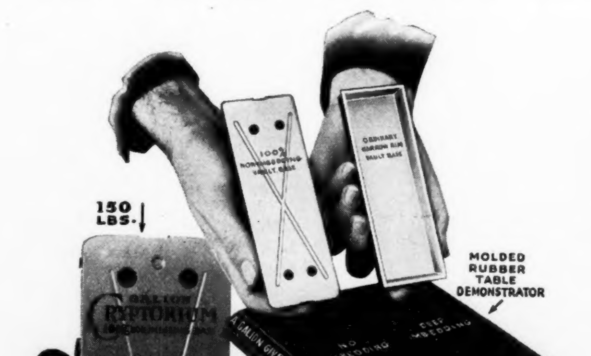
In addition to the single spray unit, assemblies comprising nozzle, rubber tubing, and faucet adapter are supplied for bath and shampoo purposes. A similar assembly is available for washing dogs. Acushnet Process Co.

Valve for Farm Tires

TO SPEED the filling or draining of farm service tires which use liquid to obtain efficient traction, a new two-piece metal valve has been developed. A bleeder extension on the valve, comprising a small piece of rubber tubing, not only materially increases the rate of liquid flow, but permits the complete evacuation of all liquid from the tire. The B. F. Goodrich Co., Akron, O.

Airplane Windshield Wiper

AN AIRPLANE windshield wiper, designed to prevent the formation of ice on the glass and to scrub it dry in heavy rains, comprises a rubber, motor-driven blade, pivoted on an axle through the windshield. The blade, revolving at 2,500 r.p.m., does not obstruct vision. To aid in ice removal, a mixture of glycerin and alcohol is fed through holes in the blade to the windshield surface. Air Associates, Inc.



Vault Display Showing Rubber Demonstrator

Oxy-Jet Bubble Spray

Rubber Industry in America

OBITUARY

Wm. E. Genung

WILLIAM E. GENUNG, for 15 years with the mechanical goods division, The B. F. Goodrich Co., Akron, O., died on July 11 of pneumonia. He was born in Madison, O., February 4, 1900, attended the local public schools, and was graduated from Ohio State University in 1924 with a degree in mechanical engineering. Mr. Genung joined Goodrich that same year. After training in the mechanical goods production department, he was transferred to the paper industry sales division as a sales engineer.

He is survived by his mother, his wife, and two sons.

He was buried in Akron, on July 14.

Conrad S. Weeks

CORONARY thrombosis caused the death, on June 3, of Conrad Schweitzer Weeks, secretary, treasurer, and general manager, The Canton Rubber Co., Canton, O. A native of Canton (October 17, 1894) he was educated at Blair and Monson acadamies and Washington & Jefferson and Buchtel College and belonged to the Masons, Phi Delta Theta, and Canton and Brookside Country Clubs.

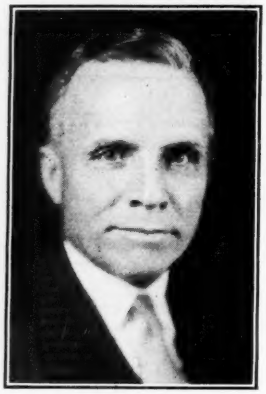
Mr. Weeks leaves his wife and a daughter.

Funeral services were held on June 7, with burial in Westlawn Cemetery.

Julius Schmid, Sr.

JULIUS SCHMID, SR., 74, who in 1883 founded Julius Schmid, Inc., 423 W. 55th St., New York, N. Y., manufacturer and exporter of druggists' sundries and toilet preparations, died in Beverly Hills, Calif., on June 6. Crippled by infantile paralysis since he was three, he came to this country from Germany at the age of 17 and secured employment in a drug store. Here he became interested in prophylatic goods and, as a pioneer in the industry, eventually organized his own company, which his two sons, Carl and Julius, Jr., have been running lately.

John V. Mowe



Blank-Stoller, Inc.

John V. Mowe

A HEART attack, on July 8, while he was at Mt. Hero, Vt., caused the death of John Vaughan Mowe, a founder and president since its inception in 1925, of Twemo Corp., 51 E. 42nd St., New York, N. Y.

He was born in Oconomowoc, Wis., in 1875. Following his graduation from high school in 1893, he served as stockyard representative for a wooden ware manufacturer.

In 1906, however, Mr. Mowe became branch manager at Detroit, Mich., for the Firestone Tire & Rubber Co., Akron. But in 1913 he joined the Goodyear Tire & Rubber Co., Akron, as special sales representative. The next year he went to Kelly-Springfield Tire Co., Cleveland, O., as assistant general sales manager and in 1920 was made vice president, a director, and general sales manager, with headquarters in New York, remaining until 1923. Mr. Mowe promoted and developed the Fairchild process and pioneered the inner tube mold, forming the Twemo company to market it.

His clubs included Lawrence Park Golf, Detroit and New York Athletic, and Lotos.

He leaves his wife, a son, two sisters, and a brother.

Services were held on July 14 at Asbury Methodist Episcopal Church, Crestwood, N. Y.

Charles T. Jones

CHARLES T. JONES, who died recently of a brain abscess, was with the Capen Belting & Rubber Co., 1920 Washington Ave., St. Louis, Mo., about 34 years, the last 13 as president and prior to that as sales manager and then vice president. A native of St. Louis (July 26, 1873), he attended Smith Academy, belonged to the Missouri Athletic and Rotary clubs, and was interested in hunting and fishing. His survivors include his wife, a son, and two daughters. Burial was in Calvary Cemetery, St. Louis.

Ralph W. Grant

WHILE attending a Shriners' parade in Baltimore, Md., on June 27, Ralph W. Grant, plant manager, Clifton (N. J.) Division, National Rubber Machinery Co., died of a heart attack.

Born in Pawtucket, R. I., April 17, 1894, he attended local schools and Brown University. Then for two years he worked for Brown & Sharpe Mfg. Co., Providence, R. I., and next joined Splitdorf Electrical Co., Newark, N. J. About 1919, however, Mr. Grant became chief draftsman for De Mattia Bros., Inc., Clifton, remaining as such until 1927. The next year the firm merged with National Rubber Machinery Co., Akron, O., and the deceased was transferred to sales engineering. In 1935, upon reorganization of the company, he became plant manager of the Clifton Division.

He was well known as a taxidermist and a clarinet player. He also belonged to several Masonic organizations, the Elks, and North Jersey Country Club.

He leaves his wife, a son, a daughter, and a sister.

Funeral services were held on June 29 in Clifton. Burial took place the next day in Pawtucket.

F. R. Johnson

FRANKLIN R. JOHNSON, of the United Machinery Corp., Boston, Mass., died at his home in Brookline, Mass., on July 19. He was born in Ansonia, Conn., on October 24, 1864, and received his early education in the local schools and Russell's military school in New Haven.

He was in succession associated with the Aluminum & Bronze Co. of Bridgeport, Conn.; the American Brass Co., the Ansonia C. & C. Co., and the S. O. & C. Co., all of Ansonia. The latter company was one of the large producers of shoe eyelets, and of this company Mr. Johnson became the head. Through this association he came to the United Shoe Machinery Co. in 1901 when the S. O. & C. Co. became one of its subsidiaries. Since then he continued actively in the management of the eyeletting business of the company.

Mr. Johnson was also president of the Aetna Portland Cement Co.; director of What Cheer Mutual Fire Insurance Co., Hope Mutual Fire Insurance Co., and Brookline Trust Co.; and a member of St. Paul's Episcopal Church, Brookline Country, Kittansett, and Algonquin clubs, and the Beacon Society.

He is survived by his wife and a son.

Funeral services were on July 21.

EASTERN AND SOUTHERN

A GOVERNMENT report reads that industrial production in June increased substantially following the April-May recession, with the seasonally adjusted rate moving sharply higher. The outlook, on the whole, except, of course, for current labor disputes, seems more on the better side than for a while back, although, naturally, war threats continue as a disturbing factor. Inventories again show further reductions, indicating that supplies are being worked down to the lowest level in keeping with current operating schedules.

Steel output, after dropping 15 points early in July, mainly because of the holiday week-end, rose to 60.6% later in the month. Contra-seasonal production was predicted for July and August, with firmer prices indicated. Bicycle production for the first five months of 1939 was 40% greater than in the same months last year, and sales have registered sharp gains for every month since the beginning of 1939. The construction industry has started the second half of 1939 with such a decided margin of activity above the contract total of the same time last year that a gain for the year as a whole appears a foregone conclusion. Many factories have started production of fall and winter footwear, and some that closed for inventory around the first of July have resumed heavier schedules than were in effect in June. Figures indicate that 1939 output may reach 1937 proportions, the record year, but the profit outlook is better because production, and presumably, therefore, sales, are being distributed more evenly through the year.

On the debit side of the ledger, however, were the contra-seasonal decline in cotton mill output and the seasonal declines in other industries. Carloadings have been off lately, but are higher than for the corresponding period in 1938. Although domestic orders for machine tools are up slightly, a drop in foreign orders has brought the index down.

Lee Rubber & Tire Corp., Conshohocken, Pa., through President A. A. Garthwaite, recently announced that sales for the first seven months of the current fiscal year were 28% above those of the corresponding period a year ago.

Quaker City Rubber Co., manufacturer of mechanical rubber goods, Comly and Milnor Sts., Philadelphia, Pa., has opened a new branch at 201 San Jacinto St., Houston, Tex., in charge of H. M. Sossaman, branch manager, to carry a very substantial warehouse stock of belting, hose, packing, and miscellaneous rubber goods used in the Southwest, and will serve Arkansas, Louisiana, Mississippi, New Mexico, Oklahoma, and Texas.

Tire Manufacturers Condemn Misleading Advertising

The tire manufacturing industry at a meeting held in Lake Placid, N. Y., July 13, unanimously passed a resolution recording its opposition to any form of misleading advertising and offering its cooperation for the purpose of eliminating misleading statements or implications from advertisements, The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., reported. All manufacturers, distributers, and dealers are being asked to cooperate in making this resolution effective, and a definite procedure has been established to correct any advertising considered misleading.

The above action was brought about by the appearance of some newspaper advertisements during the latter part of June containing certain statements regarding tire price reductions which are being attacked as misleading.

Bata Factory Started

On July 22 at 10 a.m. the cornerstone was laid for the first unit of the large shoe factory which the Bata Shoe Co., Inc., will establish on a 2,000-acre tract of land at Belcamp, Hartford County, Md. Excavation on this project was begun on June 19. Although rubber footwear will share in the output of the completed factory, production will be largely leather footwear, according to a statement received by this journal from the Bata company. While no detailed information is available at this time, it is expected that production of rubber footwear for the completed factory will be in the neighborhood of 10,000 pairs per day and will include in addition to rubber-canvas footwear rubber boots, gaiters, etc. It is not known as yet whether or not rubber-canvas footwear will be made in the first factory unit which will be ready for production in the fall.

Among the guests and speakers present at the ceremonies on July 22 were: Senators Millard Tydings and George Radcliffe of Maryland; Governor Herbert O'Connor of Maryland; Mayor Howard Jackson of Baltimore; various city and county officials from the communities around Baltimore; Jan A Bata, head of the Bata organization; John Hoza, in charge of the construction and operation of the new factory; Robert Batrla, in charge of the firm's American Department; John B. Atkinson, of Boston, Mass.; and William Fuchs, manager of Bata's New York office.

The initial unit, which is being constructed by The Price Construction Co. of Baltimore, will be a five-story building, 265 by 60 feet. The Bata company at present proposes to build eight to ten units of this size to complete the factory. Other structures contemplated include several dormitories for male and female workers, a school building, 40 two-family houses, and 10 single-family houses. As a result of Bata operations, it is expected that the population of the factory town will ultimately total 10,000.

Arrangements have been made with the Department of Labor to permit approximately 100 skilled workers to enter the United States for one year from the parent Bata factory in Czecho-Slovakia, now German territory. These workers will assist in setting up special machinery and in instructing American factory hands in Bata methods.

National Lead Co., Titanium Division, 111 Broadway, New York, N. Y., according to I. D. Hagar, general sales manager, Titanium Pigment Corp., will erect, for better accommodations of various departments, a three-story fireproof office and laboratory building on the company's manufacturing premises in St. Louis County, Mo. The building, to be 50 by 120 feet and air-conditioned throughout, will provide for coordination of the several laboratories, and suitable quarters for the sales and the purchasing departments, general office, and various executives including the superintendent, personnel director, and doctor.

Pennsylvania Rubber Co., Jeannette, Pa., on June 15 began a three-day conference, devoted largely to sales policies, for district and branch managers, with L. J. Waldron, general sales manager, presiding. Enthusiastic reports were received regarding the public's reception of the new Pennsylvania RX tire, and the demand has necessitated substantially increased production schedules. Also announced was a new line of Tuxedo Two-Tone Pinch-Proof tubes. Operations of the company were on a very satisfactory plane the first half of 1939, and sales of tennis balls and play balls have maintained a high level.

Leslie S. Gillette, formerly with the U. S. Industrial Alcohol Co., effective August 1 becomes executive vice president of the Hazard Advertising Agency, 295 Madison Ave., New York, N. Y., which is well known among suppliers to the rubber industry. Mr. Gillette has been very active in the advertising field for the past 12 years.

National Association of Waste Material Dealers, Inc., Times Bldg., New York, N. Y., will hold its fall convention at the Lord Baltimore Hotel, Baltimore, Md., October 15 to 17. A Baltimore committee, headed by Joseph Schapiro, a former president of the association, is in charge of arrangements.

(Continued on page 60)

OHIO

At Norrkoping, Sweden, Is Goodyear Tire & Rubber Co.'s Seventh Tire Factory in Foreign Lands; in Production since Mid-February, the New Plant Was Dedicated by P. W. Litchfield in Late May When He Visited Sweden

Goodyear Tire & Rubber Co., Akron, at a directors' meeting on June 26 announced it has anticipated payment of $2,000,000 of serial notes issued last December in connection with the refunding program. Of the $2,000,000 paid off, $1,500,000 was due December 29, 1939, and $500,000 was due in 1943.

R. P. Dinsmore, assistant to the factory manager, recently received his 25-year service pin from the company.

Goodrich Birthday

Goodrich Day at the New York World's Fair on July 1 marked The B. F. Goodrich Co.'s entrance into its seventieth year of corporate existence. Other ceremonies were held in connection with the firm's annual outing in Akron, O., on the same day.

At the New York celebration, witnessed by more than 500 Goodrich employes from Akron, the firm's outstanding contributions to American motoring were dramatized by six hostesses from the Goodrich World's Fair building. Clothed in motoring outfits dating from 1890, they imprinted the treads of five "epochal" tires in a concrete slab in front of the arena grandstand. These treads represented: solid "horseless carriage" tire; pneumatic automobile tire; cord tire; balloon tire; and two representations of the current Goodrich Life Saver tire.

Among the Goodrich employes present were David and Peter Seiler, both of Akron, who together represent a century of service to the company, each having been with the organization for 50 years. They were honored by service awards received from Albert Hupfer, president of the firm's 20-Year Club.

Sales Contest

Sales exceeding quotas by 18 to 1,300% resulted from the three-months' World's Fair sweepstakes conducted by Goodrich for managers of several hundred Silvertown Stores throughout the nation, according to Frank T. Tucker, Goodrich tire advertising manager. The company paid expenses of the 57 winners in their trips to the New York Fair last month.

Footprints of the American Automobile

General Tire & Rubber Co., Akron, entertained recently as guests of J. A. Andreoli, export manager, and his department members several General Tire people from abroad, including C. O. Perkins, General export representative in Panama and Central America, and his two daughters; Charles A. Blue, tire sales manager, Pacific Commercial Co., Manila, Philippine Islands; R. Smith, manager for Charles Person, General Tire distributer in Panama; and Carlos Semsch, General Tire distributer in Peru and treasurer of Enrique Ferreyros & Cia. S. A., Lima, and his wife and his sister.

The Tire & Rim Association, Inc., on July 1 moved from 1401 N.B.C. Bldg., Cleveland, to 304-5 Peoples Bank Bldg., Akron.

Arthur B. Newhall, who had been with the Hood Rubber Co., Watertown, Mass., for over 20 years and last December became executive vice president of the B. F. Goodrich Co., Akron, O., resigned from that position on July 1 to assume new duties as vice president of Talon, Inc., Meadville, Pa., manufacturer of slide fasteners. Mr. Newhall is to continue as a director and as a member of the executive committee of both the Hood and Goodrich companies, and as such he will still be very much in contact with the rubber industry.

Firestone News

In response to many requests from employes to provide insurance to take care of expenses incidental to hospitalization for members of their families, Firestone Tire & Rubber Co., Akron, negotiated a contract whereby The Prudential Insurance Co. would insure employes for hospitalization with respect to their dependents provided 75% of the eligible employes subscribed to the plan. The company announced on June 19, 1939, that more than 75% of the eligible employes had subscribed to the Group Insurance Hospitalization Plan for Dependents of Firestone Employes; consequently the insurance became effective on that date. The new plan provides the following benefits: Daily Hospitalization Benefits covering cost of room and board not exceeding $4. Laboratory Fees, Operating and Delivery Room Charges, X-ray examinations, and the administration of anesthetics not exceeding (in any one case) $25. Total Hospitalization Bene-

(*Continued on page* 61)

NEW ENGLAND

SINCE mid-May a slight improvement in general industrial activity has been noticed in New England.

Payrolls of Rhode Island manufacturers for June, totaling $277,601, were 25.9% higher than a year ago, but 11% under May, 1939, according to the Brown Bureau of Business Research. Electric power used by the rubber industry during June was up 35.3%. Kilowatt hours amounted to 2,454,000 in June, 1939, against 1,814,000 in June, 1938. During the first half of 1939 power consumption by the rubber industry increased 45.6% over the corresponding period last year.

The Black Rock Mfg. Co., manufacturer of rubber cutting and light rubber machinery, Bridgeport, Conn., according to President G. L. Hammond, recently appointed Lombard Smith, of Lombard Smith Co., 2032 Santa Fe Ave., Los Angeles, Calif., as representative for the Pacific Coast, covering Washington, Oregon, and California. This move was made so that Black Rock would have quick and efficient representation to meet the constantly increasing volume of rubber products on the Coast.

Anaconda Wire & Cable Co., the New York, New Haven & Hartford Railroad, Pawtucket Chamber of Commerce, and representatives of the City of Pawtucket conferred last month anent the proposed expansion of operations at Anaconda property on Main St. in the South Woodlawn district. That Anaconda may spend $150,000 for this expansion was confirmed by General Manager William H. Morley, although he stated he could make no promises to that effect as it is contingent upon improved business conditions. At present the crowded plant needs more space, so much so that work has been started on a two-story and basement brick addition, 59 by 60 feet, to cost approximately $9,000. Mr. Morley stated the plant may eventually have to construct a new main building, but that depends largely on the railroad facilities available. Anaconda now receives most of its manufacturing supplies and ships its products by trucks. The cost of shipping to western points by this method is high, and the company hopes that satisfactory arrangements can be made to ship by rail and boat. Representatives of the New Haven Railroad declared a preliminary survey had been made and the proposed spur track would entail an estimated expense of about $30,000. It was tentatively proposed that this expense be divided by Anaconda and the railroad, although it was stated by Public Works Commissioner Albert J. Lamarre and City Engineer Thomas E. Harding that the city would probably cooperate in the project.

Fisk Reports

The Fisk Rubber Corp., Chicopee Falls, Mass., according to H. R. Hurd, advertising manager, now has a continuous window display at Rockefeller Center, New York, N. Y., with the exhibits to be changed monthly. The company also plans an exhibit in the showcase in the Springfield (Mass.) Railroad Station from July 31 to August 21, one at the Eastern States Exposition at Springfield from September 17 to 23, and one at the South Station in Boston, date not yet decided. Fisk also recently released "America's Safest Tire," a motion picture story based on the Safti-Flight tire, and thirty copies of the film are being shown throughout the country.

Tire Tests

Filmed recently in Hollywood were tests conducted by C. E. Maynard, Fisk Tire engineer, to demonstrate the stamina and efficiency of the modern automobile tire.

Testing Tires by Hurtling Car over Four Sedans

The accompanying illustration shows Cliff Bergere, racing driver and stunt man, hurtling his car over four sedans and landing safely without a blow-out. The car roared up the 25-foot ramp at 40 miles an hour to make a 25-foot jump through the air at a height of four feet, clearing the engine hoods of the sedans.

Information secured from such tests aid engineers in building tires with greater strength and durability. After the tests the tires are dissected in the laboratory for study.

Tire manufacturers yearly spend nearly a million dollars on tire testing programs with the result that tire mileage has increased from an average of 2,500 miles in 1913 to between 20,000 and 30,000 miles today.

Consumption Forecast

World consumption of raw rubber will reach over 1,500,000 tons, a 50% increase over the peak of 1937, within the next ten years, J. M. Slattery, rubber and cotton department manager of the Fisk Tire Co., recently predicted. This growth will be based upon new developments in aviations, plastics, and a multitude of other new uses for rubber, with the automobile industry remaining a major consumer for the immediate future. Rubber, he believes, will also be a dominating factor in solving the noise problem in large cities. Among new products that will contribute to increased consumption are sponge cushions and mattresses, cushions for railroad tracks, traffic markers, new flooring, furniture, and packaging materials, and latex garments. Today there are more than 35,000 uses of rubber, with greater expansion expected in many of these, Mr. Slattery said.

Howard S. Almy, an official of the Collyer Insulated Wire Co., Pawtucket, R. I., and of the Rhode Island Association of Credit Men, was a speaker at the recent forty-fourth annual convention of the National Association of Credit Men and the Credit Congress of Industry at Grand Rapids, Mich.

Farrel-Birmingham Co., Inc., Ansonia, Conn., for the third consecutive year gave a week's vacation with pay at all its plants to all hourly workers who have been regularly employed by the company one year, prior to May 1, 1939. The vacation period was the week of July 3, when all production work was shut down in the company's three plants at Ansonia, Derby, and Buffalo.

Davol Rubber Co., Providence, R. I., Mutual Benefit Association held its twenty-second annual outing on July 8 at Crescent Park, Riverside, R. I., attended by more than 500 employes, their families, and company executives. The program for the day included sports events, dinner, the awarding of prizes, and amusements in the Park. The officers of the association are: president, L. P. Williams; vice president, C. Jalbot; treasurer, E. Osborne; and secretary, Mary Monahan; committee, arrangements for the outing: Chairman A. Priest, S. Miller, J. Harris, K. Spencer, and J. Rielly.

General Cable Corp. will continue this summer the vacation-with-pay plan inaugurated three years ago, according to General Manager A. Stanley Watson. Employes with the firm 18 months who have worked an equivalent of a

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NEW JERSEY

THE majority of rubber manufacturers in New Jersey report some gain in business during the past few weeks, indicating that conditions will continue to improve gradually. Many plants were closed a week in July to allow employes a vacation with pay. During the shutdown machinery and other equipment were overhauled. Indicative of an increasing production is the better demand for reclaimed rubber.

Jos. Stokes Rubber Co., Trenton, reports a better volume of business at both the Trenton and Canadian plants.

L. Albert & Son, rubber machinery, Trenton, stated its three plants, in Trenton, Akron, O., and Los Angeles, Calif., are running to capacity, with 50% of the business being in export trade.

Essex Rubber Co., Trenton, finds business satisfactory and prospects for the fall trade good. A company executive, who has been visiting the trade in New England, reports orders are picking up.

Luzerne Rubber Co., Trenton, reports a general pick-up in business. The plant was closed a week for vacations. Employes held their annual outing July 15. Activities included a baseball game between the Luzerne workers and a team from the Acme Rubber Mfg. Co., Trenton. The proceeds of the outing went to the sick benefit fund of the Luzerne concern.

Nearpara Rubber Co., Trenton, announced a noted improvement in business with a better demand for reclaimed rubber.

Crescent Insulated Wire & Cable Co., Trenton, reports that an increase of from 10 to 15% in prices has stimulated business. An official declared that this was an indication of a further upturn in business.

Pierce-Roberts Rubber Co., Trenton, is receiving increased orders for radio parts and druggists' sundries.

Whitehead Bros. Rubber Co., Trenton, is enlarging its office building with a new addition. The company was recently closed for a week when the employes were given a vacation with pay.

Superior Hard Rubber Co., Butler, manufacturer of super-insulated hard and semi-hard rubber molded goods, has been purchased by Vice President W. Hopper, who states he will carry on the company with the same set-up as formerly. Mr. Hopper has been connected with the concern since it started operations in 1923; he worked in the plant on experimental work, next was in charge of magneto parts production, and then became superintendent and general manager.

Raybestos-Manhattan, Inc., at a meeting of the board on July 19 elected W. H. Dunn, who is a director, comptroller, and assistant treasurer of the company, as secretary to succeed Morton F. Judd, general manager of The Raybestos Division, who died recently. Mr. Dunn has offices at The Manhattan Rubber Mfg. Division at Passaic, N. J.

Pocono Co., Trenton, found business for June, 1939, better than in June, 1938.

Horace T. Cook, president, Hamilton Rubber Mfg. Co., Trenton, summering at Fisher's Island, N. Y., has been made a member of the Men's Golf Committee. A. Boyd Cornell, secretary of the Hamilton company, and Mrs. Cornell, are spending the summer at Bay Head, N. J.

Home Rubber Co., Trenton, is erecting a one-story office building at its plant on Wolverton Ave.

Mercer Rubber Co., Hamilton Square, is experiencing improving business.

MIDWEST

CONDITIONS appear to be improving somewhat in the Midwest, with reports of greater consumer demand in many fields. Rubber concerns experienced a 0.4% drop in the number of employes, but a 2.5% gain in payrolls over the previous month. Major district crops are coming along well, but harvests are expected to be under 1938 because of reduced acreage. Farm prices have strengthened.

The automobile industry is harassed by labor trouble that threatens to upset production schedules for 1940 models. With the production season for 1939 cars at a close, factory output has declined more than seasonally lately, and factory sales have been falling off steadily for the last several months. Scattered introductions of a few makes of 1940 cars are expected the latter part of this month.

Monsanto Chemical Co., St. Louis, Mo., has announced that F. A. Abbiati, with the Merrimac Division for the past 12 years, has been made assistant general manager of sales of Monsanto's plastics division.

Capen Belting & Rubber Co., 1920 Washington Ave., St. Louis, Mo., on June 3 held election of officers, as follows: president, James W. Moyle; vice president, Samuel J. Henry; secretary-treasurer, John J. Tierney. Mr. Moyle for the past 18 years was with The Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., Passaic, N. J., for which Capen is exclusive distributer in the Missouri and southern Illinois territories, and he succeeds the late Charles T. Jones, who died May 6. The other two officers have been with the Capen organization for many years.

EASTERN

(Continued from page 57)

U. S. Tire Dealers Corp., 1790 Broadway, New York, N. Y., has announced through H. N. Hawkes, general sales manager, establishment of the San Francisco district sales branch as a divisional headquarters office to include the northern half of California, Nevada, the Salt Lake City district, and the Hawaiian Islands. Chester W. Ort, sales manager of the Los Angeles division for the past year, will head the newly created San Francisco division and is succeeded at Los Angeles by Harry O. Bock, heretofore divisional sales manager at Detroit.

Hohwieler Rubber Co., Morrisville, Pa., having increased working hours to fill orders for rubber sporting goods, is operating four days a week.

National Industrial Advertisers Association will hold its 1939 conference in New York, N. Y., at the Hotel New Yorker, September 20 to 22, when 39 experts, representing every phase of industrial advertising, will act as leaders and co-leaders of 11 industrial advertising clinics. Among the clinic leaders are Ted Marvin, advertising manager, Hercules Powder Co., Wilmington, Del.; H. E. Van Petten, advertising manager, mechanical division, The B. F. Goodrich Co., Akron, O.; Fred Pinkerton, manager of sales promotion, mechanical goods division, United States Rubber Co., New York; Ralph N. Hanes, sales promotion manager, New York Belting & Packing Co., Passaic, N. J.; and Charles C. Chamberlain, advertising manager, Jenkins Bros., New York.

Vulcanized Rubber Co., Morrisville, Pa., has announced the resignation of Treasurer Hugh A. Ross, who is moving to Seattle, Wash. He is succeeded by the assistant treasurer, Alfred O. Redland.

Bloomingdale Rubber Co., Chester, Pa., has sold the buildings and real estate comprising its old factory at Butler, N. J., to Joseph Piluso of Jersey City, who intends to manufacture corkwood novelties. Bloomingdale Rubber Co. has transferred the equipment to its Chester plant where production from both factories has been consolidatd.

The United States Navy Department has awarded contracts, $12,612 each, to the following for electric cable: Phelps Dodge Copper Products Corp., 40 Wall St., New York, N. Y.; Rockbestos Products Corp., New Haven, Conn.

The Marblette Corp., Long Island City, N. Y., utilized rubber molds, made by pouring latex over plaster forms, in the production of the 12 phenolic resin statues for the Federal Building at the New York World's Fair. The statues, 9½ feet high, are the largest monolithic resin castings ever made successfully.

FINANCIAL

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and wholly owned subsidiaries. Second quarter, 1939: net profit, $20,796,159, against $19,075,376 in the preceding quarter and $9,877,003 in the corresponding period last year. Available for common dividends was $19,134,962, equal to $1.73 a share on the 11,056,371 shares outstanding.

General Electric Co., Schenectady, N. Y. First half, 1939: net profit, $16,-370,192, equal to 57¢ a common share against $13,176,956, or 46¢ a share, in the first half of 1938; sales billed, $146,-299,212, against $130,910,638; orders received, $169,071,646, against $128,223,823.

General Tire & Rubber Co., Akron, O., and subsidiaries. Six months ended May 31, 1939: net profit, $1,103,575.38, equivalent to $1.96 per common share; net sales, $10,917,345.94 against $8,322,-039.48, for the same period in 1938.

Hewitt Rubber Corp., Buffalo, N. Y. Six months to June 30: net profit, $81,053, equal to 48¢ each on 168,188 shares of $5 par common stock, against $21,787, or 13¢ a share, last year.

Hercules Powder Co., Wilmington, Del. First half of 1939: net profit, $2,-269,470, after taxes and all charges, against $1,227,134 in the first half of 1938. After provision for dividends on the preferred stock the 1939 result for the first six months is equal to $1.52 each on the 1,316,710 shares of no-par common stock, against 73¢ a share corresponding last year. For the 1939 June quarter earnings were $1,182,148, or 79¢ a share; against $571,107, or 33¢, in the same period of 1938.

Pharis Tire & Rubber Co., Newark, O. Seven months ended May 31: net profit, $242,636, equal to $1.10 a common share; gross sales, $4,700,154, an increase of $1,065,837 over the same period a year ago.

CANADA

International Press, Ltd.

James I. Simpson

New Dunlop President

At a recent directors' meeting of Dunlop Tire & Rubber Goods Co., Ltd., Toronto, James Inglis Simpson, formerly vice president and general manager, was elected president. Sir J. George Beharrell, D.S.O., continues as chairman of the board, and Arthur B. Purvis, formerly president, becomes vice chairman.

Born in Elgin, Scotland, on June 17, 1885, Mr. Simpson began his career in the banking profession, serving with the British Linen Bank in Elgin, Scotland, and later with the Royal Bank of Canada in Vancouver, B. C. From 1911 to 1939, with a break from 1916 to 1918 when he was a lieutenant in the Irish Fusiliers, his scope of service and responsibility has steadily widened, taking in such positions as assistant treasurer, Dominion Trust Co., Vancouver; division manager, Canadian Industries, Ltd., Paint & Varnish Division, Toronto; general manager, Fabrics & Finishes Group, Canadian Industries, Montreal; general manager and then (1933) vice president and general manager of Dunlop; vice president, Rubber Association of Canada, 1938; and now Dunlop president.

Today Mr. Simpson is a prominent citizen of Toronto, identified with many social and civic organizations. He is an ardent golfer and curler, and his clubs include National; Granite; Lambton Golf; Mississauga Golf; Rotary; Mount Stephen; and Winter.

He is Protestant, married, and has one son.

Bata Canadian Factory

According to reports, construction will soon start on a new Bata factory in Canada at Frankford, Ont. This enterprise is being conducted by Thomas Bata, nephew of Jan A. Bata, head of the great shoe manufacturing industry in Czechoslovakia. The Canadian government will admit a limited number of technicians from abroad necessary to the opening of the new plant. The company hopes to sell its Canadian output to Empire countries under the special tariff concessions provided within the British Empire.

Rubber Exports

The Dominion Bureau of Statistics has announced that May rubber exports were valued at $1,403,173, against $1,204,577 in April and $1,270,277 in May, 1938. Exports of pneumatic tire casings, going to 71 markets, were valued at $616,083. Boots and shoes wholly or partly of rubber, were worth $449,-742, with the United Kingdom taking the bulk.

Ohio

(*Continued from page* 58)

fits in any one case shall not exceed $250. The above plan was made available to all employes for their wives and children provided they, themselves, were insured under the existing Hospitalization Plan.

All Firestone factory departments were closed for vacations from July 1 through July 9. The factory then operated on preference production the week following the shutdown.

Motorcycle Day at the World's Fair

Motorcycle Day, attended by representatives from the United States and Canada, will be celebrated at the New York World's Fair on August 6, with the Firestone exhibit as the gathering place for arrivals for whom special parking facilities will be provided. Motorcyclists will first register at the Firestone exhibit, go to the General Electric Exhibit for three special shows, then reassemble at the Firestone building to be welcomed by Clifford Smith and "Brownie" Carslake of the rubber company. A special program devoted to motorcyclists then will follow, a feature of which will be the granting of awards including a trophy to the rider coming the longest distance to the fair.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Dayton Rubber Mfg. Co.	A	$0.50 q.	Aug. 1	July 15
Dayton Rubber Mfg. Co.	Com.	$0.50	Aug. 15	Aug. 1
De Vilbiss Co.	Com.	$0.50	July 15	June 30
De Vilbiss Co.	7% Pfd.	$0.17½ q.	July 15	June 30
Fisk Rubber Co.	Pfd.	$1.50 q.	July 20	July 10
General Tire & Rubber Co.	Com.	$0.50 reduced	July 31	July 21
Lee Rubber & Tire Corp.	Com.	$0.75 irreg.	Aug. 1	July 15
Norwalk Tire & Rubber Co.	Pfd.	$0.87½ q.	Sept. 29	Sept. 15
Philadelphia Insulated Wire Co.	Com.	$0.15 reduced	Aug. 15	Aug. 1
United States Rubber Co.	8% non cum. 1st Pfd.	$2.00	Sept. 22	Sept. 8

Rubber Industry in Europe

GREAT BRITAIN

Tenasco Yarns

A new type of high tenacity yarns made by a modification of the ordinary viscose spinning process has been put on the market by Courtaulds, Ltd., under the name Tenasco. It is well known in the rayon industry that by applying a graduated stretch to the plastic filaments during their formation and fixation, their tenacity can be increased with a corresponding decrease in breaking elongation. In making the new yarn the conditions of stretch-spinning are chosen so as to yield a dry tenacity considerably higher than normal, with an extensibility which can be suited to the purpose for which it is required. The most highly stretched Tenasco, Type A, is said to have a dry tenacity over 75% greater than ordinary rayon, and a lower extensibility. At present its most extensive use is in cords for automobile tires, but it offers possibilities for use in industrial products.

Tenasco Type A also has very high elasticity, being exceeded among fibers generally only by real silk and the new American fiber Nylon. Unlike cotton, all rayons, and particularly Tenasco, have the power of acquiring tenacity when subjected to sudden shocks.

A typical tire cord is made in three-ply construction; each cord has three twisted strands, each formed of five twisted Tenasco threads of 275 denier. The singles twist is three turns per inch, left; the intermediate twist may be 19 turns right, and the cable twist ten turns per inch, left. A cord of this construction weighs 0.57-gram per meter and has a breaking load of 21½ pounds, compared with a normal cotton cord weighing 0.50-gram per meter and breaking at 18 pounds. When subjected to prolonged heating at 250° F., the breaking load for cotton cord is only 11¾ pounds; while for rayon cord it is 17¾ pounds, or an increase in strength of rayon of 32%, allowing for the difference in weight.

Neoprene Conveyer Belts

Hitherto rubber-covered conveyer belts have given good service in the handling of coal. Recently, however, power plants have begun to use oil-treated coal for fueling, and the usual rubber-covered conveyer belts are proving unsatisfactory. In one plant, a Neoprene covered belt is reported still in good condition after more than a year's service. Despite the severe demands imposed by the prolonged action of oil and coal, abrasion resistance is said to be unimpaired.

Synthetic Rubber Fears

There is at present in England greater preoccupation with the question of synthetic rubber than ever before, and this is shown by two different sections of the rubber industry. First are those with interests in plantation rubber who fear the natural product may be replaced by synthetic rubber, and secondly are those who fear that in case of war England might be shut off from her sources of crude rubber supply and who recommend large-scale synthetic rubber factories.

The first group is reassured by a notice in the *Bulletin of the Rubber Growers' Association* which points out that as far as service is concerned, nothing has yet been produced that can assail the position of plantation rubber for general utility. It is recognized that German synthetic rubbers are being heavily subsidized, and it is granted that this might reduce production costs, but it is pointed out that production costs of plantation rubber also trend downward and there are good reasons to believe that the natural product can be endowed with complementary properties of synthetics; this, it is added, is one of the important objectives of producers' research. Finally the possibilities of using rubber as a basic material for the manufacture of commercial articles not necessarily possessing the properties of rubber have to be further explored.

Dr. Schidrowitz, in his "Views and Reviews," in *The India Rubber Journal*, attacks the stand of the second group. While he admits the necessity and even the inevitability of a factory for producing synthetic rubber for special purposes, he totally disagrees that it is necessary or desirable to erect vast synthetic rubber plants to provide a substitute for natural rubber in case of war.

"Surely it must be very much cheaper and much safer," he says, "to store a sufficient supply of the natural material, than to build huge factories at enormous expense, and which would be much more difficult to protect from air attack. There should be no great difficulty in providing for the finance and storage of sufficient plantation rubber in this country to last for several years, and the provision of such stores and the financing of the rubber would, as I see it, involve no more than a fraction of the cost of erecting factories to supply say 20 to 50 thousand tons of synthetic rubber per annum. It must be remembered that the ordinary commercial stocks of raw rubber in this country amounted not long ago to well over 100,000 tons, a quantity which might possibly, in the event of war, be sufficient for—at a pinch—one or two years, I cannot see that there should be any great difficulty in maintaining a permanent reserve of between 100 and 150 thousand tons of raw rubber in this country at all times, if it be held by the competent authorities that any serious interruption of supplies from overseas is likely to be within the realm of possibilities."

Removal Notice

The Rubber Age, *The Rubber Index*, and *The Rubber World*, on June 16 moved from 88/90 Chancery Lane, London, W.C.2, to 147 Grosvenor Rd., London, S.W.1.

GERMANY

Buna in Brake Linings

A new type of brake-lining, known as Emero, for which Rudolf Ostwald is responsible, is composed chiefly of aluminum or steel wool with Buna as the binder. These brake linings are said to have unusually good heat conductivity. Their friction coefficient is practically unaffected by moisture so that direct cooling with water is possible. They have considerable resistance to high temperatures; even at 500° over prolonged periods the brake linings were not destroyed, although they did show increased wear. Resistance to abrasion and other properties are also said to be unexpectedly favorable when compared with asbestos linings.

Foreign Patent Rights

Before Germans enter negotiations with foreign patentees for the acquisition of patent rights or licenses, they are advised to consult the foreign exchange office here. For according to a new ruling permission to make payments for foreign patent rights, licenses, or charges connected therewith —as lawyers' fees, and the like—will depend on the importance of the foreign patent for German export trade. No special permission is required in transferring German patent rights or licenses to foreigners, but those who sell such rights abroad below their value are subject to punishment.

Imports and Exports

German crude rubber imports came to 323,042 quintals in the first four months of 1939 against 310,697 quintals in the same period of 1938. The imports of manufactures during the first

third of 1939 totaled 10,252 quintals, value 2,307,000 marks, and of exports, 75,988 quintals, value 17,237,000 marks.

Working Buna

At a recent meeting of the Berlin District Group of the Deutsche Kautschuk Gesellschaft, Dr. Stoecklin discussed experiences in working Buna. At present, he said, the types of Buna being produced are Buna S, Perbunan, and Perbunan extra. Production of Buna 85 was stopped on May 1, 1939. Buna 32, which takes the place of a softener, will continue to be produced in the future if necessary.

Non-fading Buna types and Levulkan are still in the experimental stages. The latter, however, has already aroused considerable interest. It is a mixed polymer of butadiene and styrol and is to Buna S what Perbunan extra (formerly Buna NN) is to Perbunan (formerly Buna N). Levulkan is not intended to replace Buna S, but to be mixed with it to facilitate calendering and extruding and to improve certain of its qualities. While Levulkan is more easily worked and has better adhesion than Buna S, it is inferior in elastic properties, resistance to cold and abrasion.

Dr. Stoecklin also showed that the resistance of Perbunan to cold depends on elasticity and hardness (measured at + 20° C.). Softeners which considerably increase elasticity improve the resistance to cold. The fillers showing the most favorable behavior in this respect are semi-active blacks and barytes. The heat-resistance of Perbunan vulcanizates (with Vulkacit Thiuram and M.B.) can be considerably improved by storing the raw mixes.

SWEDEN

On page 65 of the June issue of INDIA RUBBER WORLD was published a report from the American Consulate at Stockholm that an American firm which was to take over the Trelleborgs Gummifabriks A/B, Trelleborg, producer of tires and footwear, would modernize the plant and increase its capacity. Word has since been received direct from Trelleborgs Gummifabriks A/B, Trelleborg, that it still is a Swedish company and is run with wholly Swedish capital.

RUMANIA

With a daily capacity of 600 tires and tubes, the new plant of The Banloc Mfg. Co., Baicoiu, Rumania, near Bucharest, began operations June 3. Organized by Rumanian interests acting in conjunction with the government, the company will manufacture rubber goods, principally tires and tubes, to supply the needs of that country.

The main building of Banloc, one story high, 100 feet wide, and 600 feet long, with the various additions has a total factory floor area of 75,000 square feet. Besides the factory building the plant has two pump houses, a gate house, and a modern four-family apartment building on the grounds. The building structure is of reenforced concrete three bays wide with the center bay raised, and the outside walls are of red face brick. The site of 20 acres, landscaped with lawns and gardens, is enclosed with a brick and concrete fence.

The B. F. Goodrich Co., Akron, O., U. S. A., was selected by Banloc as a source of technical information, and products of Goodrich quality will be produced there. Goodrich, however, has no financial investment in the venture.

All equipment for the plant was purchased in the United States, and the modern production unit was constructed under the direction of a Goodrich engineer.

FRANCE

A conference was held at Maison de la Chimie on May 10 on the "Development and Future of Synthetic Rubber in France;" while on May 15 a debate took place at the same place on "Should the Manufacture of Synthetic Rubbers Be Developed in France?"

In recent issues of local trade papers, Fernand Jacobs, who seems to have started it all, replies to certain objections and questions raised during the debate, concentrating chiefly on the remarks of M. Martin, director of the Societe des Matieres Colorantes de Saint-Denis.

According to M. Martin, French manufacturers of chemical products at present have little or no inclination to start producing synthetic rubber since the consumption in France does not amount to more than five tons a month. Moreover consumers have not indicated the type of synthetic rubber they would prefer to use, and until this is determined and substantial government support is insured, a synthetic rubber factory should not be started in France. Mr. Martin believes the country should have large stocks of plantation rubber,

(Continued on page 65)

Outside and Interior Views of The Banloc Mfg. Co.

Rubber Industry in Far East

NETHERLAND INDIA

Purified Rubber

Recently details were published by J. W. van Dalfsen, of Rubber Research Division of the West Java Experiment Station, regarding purified rubber, (rubber specially processed to be largely free from the non-rubber constituents, as albumen, salts, quebrachitol, and resins). Purified rubber is used chiefly where low water-absorption is required, for instance in the manufacture of insulations for high tension wires. The quality of such articles as water hose, hot water bottles, and divers' suits can also be considerably improved by using purified rubber. The most recent use of this material is in making rubber derivatives, particularly paints, varnishes, and packing material. Purified rubber is also useful for manufacturing odorless rubber goods. The author is of opinion that, although still comparatively small, the use of purified rubber will increase. Its preparation is recommended only to a few skilled estates.

Research Work for 1939

The second report of the Rubber Foundation covering the year 1938 indicates work to be undertaken by the West Java Experiment Station in 1939. Among others, the changes which occur in preserved latex when stored, are to be examined from a chemical and physical viewpoint; *Hevea* latex and rubber and non-*Hevea* rubbers are to be studied for possible favorable properties. Oil resisting qualities by modification of the rubber molecule is also to be investigated.

The possibilities of using rubber powders and latex for roads and floors are being investigated at Bandoeng by the Netherland India Road Association in collaboration with Buitenzorg, and it is intended to lay fairly large trial patches on public roads during 1939. Also the use of latex-cement compounds for floors will be studied in collaboration with the Nederlandsch-Indisch Latex Industrie at Bandoeng.

Latex Exports

Most latex shipments from Netherland India come from Sumatra. Java supplies only a small amount: in 1938, 152 metric tons dry weight, against 122 metric tons in 1937. Latex exports from Sumatra totaled 6,127,906 kilos, dry in 1938, against 13,748,000 kilos in 1937. Of the 1938 shipments, 3,055 kilos (dry) were rubber with a content of less than 35%; 1,103,509 kilos had a content of 35 to 40%; 134,741, 40 to 55%; 4,326,728 kilos, 55 to 60%; and 559,873 kilos were Revertex.

Viscosity and Creaming Capacity of Latex[1]

That there appears to be a connection between the viscosity of a latex and the D. R. C. of the cream after the latex has been creamed is the conclusion reached by J. W. van Dalfsen as a result of experiments conducted at the West Java Experiment Station, Buitenzorg, Java. By creaming capacity, he understands the increase in D. R. C. obtained as a result of "normal creaming," which is creaming in which 14 ml. of a 1% konnyaku flour solution is added to 100 ml. latex containing three to five grams of ammonia per liter.

The experiments showed that two latices having the same D. R. C. may differ considerably as to viscosity and that if a latex has a high viscosity to start with, only a slight increase in the D. R. C. is obtained by creaming it; whereas a latex with a lower viscosity yields a cream with a higher D. R. C. This statement, Mr. van Dalfsen points out, is in contradiction of the observations made regarding simple creaming or sedimentation of substances other than latex.

It was found that the viscosity is lowered and creaming capacity improved by increasing the interval before ammoniating fresh latex. Examination of latices stored for eight months indicated that storage also causes the creaming capacity of suitably ammoniated latex to be increased and viscosity lowered.

The addition of increasing amounts of creaming agent results in increased viscosity and decreased rubber losses in the serum; but there is an optimum amount of creaming agent which gives the highest D. R. C. In latex artificially thickened with Latekoll, creaming was retarded, and in general a poorer cream was obtained, although under certain circumstances a more highly concentrated cream is obtainable.

The viscosity of latex is lowered, and creaming capacity raised: by the addition of soap or Igepon; when it is rapidly moved about, as when latex (with or without the creaming agent) is passed through a colloid mill; when it is purified by pre-coagulation; when the non-rubber constituents are partially removed by mechanical means; when it is repeatedly creamed.

As the latex used in the experiment in most cases came from young trees from the garden of the Experiment Station and as only 80 observations were made, the data are as yet too inadequate and one-sided to permit the working out of a mathematical relation between viscosity and creaming capacity; however the following conclusion is permissible: that—irrespective of pre-treatment, but provided the latex shows a normal microscopic picture—the lower the viscosity of a latex, the higher is its average creaming capacity.

The relation observed between viscosity and creaming capacity of ammoniated field latex is important as it permits the determination of the probable creaming capacity of a latex and hence simplifies the selection of latices suitable for creaming.

[1] *Arch. Rubbercultuur*, Feb. 3, 1939.

SIAM

The big planters on southern estates in Siam evince considerable interest in bud-grafting. Prince M. C. Lakshnakara, chief botanist of the Bureau of Plant Industry of the Department of Agriculture, Siam, and Luang Vichien Dhatukarn, head of the chemistry division of the Department of Science, recently accepted an invitation to Malaya to get first-hand knowledge of rubber growing there.

They are also interested in clonal seed planting. A local paper states that Siam hopes soon to have an organization like the Rubber Research Institute. The labor situation is less favorable in Siam than in Malaya since coolies in the former country receive about 80 cents (Straits currency) daily.

BRITISH INDIA

The average annual consumption of crude rubber by India over the last three years is estimated at more than 6,000 tons, which is likely to rise because of new local factories. Present large users are Dunlop, which manufactures tires also for an American concern; Bata, producing rubber footwear on a large scale; and several local footwear factories. A large new tire factory being built at Sewri, near Bombay, for an American concern, will help increase considerably India's crude rubber consumption.

Imports of automobile tire casings decreased from 284,195 in 1937 to 217,664 in 1938. While shipments from the United Kingdom declined from 205,054 units in 1937 to 158,459 in 1938, and those from the United States dropped from 29,437 to 11,396, tire imports from Germany increased from 21,666 to 27,841 units.

MALAYA

Chermang Development

Chermang Development, Ltd., formed about 10 years ago by a group of Malayan rubber companies to grow budded rubber, now has 1,500 acres of bud-grafts planted, which area would have been larger except for the ban under the first period of the present regulation scheme. The company has purchased rights for an additional 425 acres and expects to plant 300 acres this year and the balance in 1940. To finance this enterprise 120,000 new shares have been issued.

Tapping on the mature area was commenced in January, 1938, on 200 acres and increased by December to 543 acres. At first tapping was on an experimental scale; results obtained are stated to have been uniformly good; yields from three clones exceeded the recorded figures of experimental tapping on trees of the first vegetative generation and in all cases—except one—exceeded the average figures for commercial tappings as received and compiled by the Rubber Research Institute.

Clonal Seedlings

It has frequently been brought out by advocates of clonal seedlings (trees grown from seed of bud-grafts in isolated gardens) that these are less liable to disease, especially Brown Bast, than bud-grafts. But the planting correspondent of the *Straits Times* states that the superintendent of the Rubber Research Institute's experiment station at Sungei Buloh has informed him that seedlings received from 25 isolation gardens in Java and planted here in 1929 are showing a tendency to Brown Bast. At the same time yields in the case of many of the families are not increasing.

Imports and Exports

In 1938 imports of tire casings for automobiles were 119,120 units as compared with 145,443 units in 1937, due partly to a decrease in Japanese shipments from 15,460 tires in 1937 to 10 tires in 1938. Shipments from the United Kingdom fell from 71,830 to 60,085 units; Canada, from 34,477 to 30,764 units; United States, 17,061 to 16,388 units. On the other hand purchases from the Continent of Europe increased from 4,394 units to 6,290 units, and those from Netherland India increased from 2,221 to 5,583 units.

JAPAN

Scrap Rubber Imports

Figures from Japan indicate that imports of scrap rubber in the first quarter of 1939 totaled 3,404 metric tons, against 855 tons in the corresponding period of 1938. Most of the scrap comes from America, and many of the old tires are to be retreaded. The Department of Commerce and Industry has urged the Japan Tire Remanufacturing Guilds Federation to increase these imports from the United States, and it has been decided to buy 50,000 metric tons of old tires.

American figures for scrap exports to Japan increased from 2,654,602 pounds in the first four months of 1938 to 17,270,509 pounds in the first four months of 1939. These figures indicate an extraordinary spurt in scrap exports in April, 1939.

New Restrictions

Automobile tire and tube distribution is to be controlled with the aim of economizing; crude rubber supplies for power belting have been curtailed, only 50 metric tons per month being allowed, of which half is intended exclusively for belting for the gold-mining industry. As a result there is a shortage of rubber power belting on the one hand; while on the other manufacturers without contracts to supply belting for gold mining have had to cut output. The distribution of reclaim and the erection of new reclaiming plants are to be put under strict control.

Synthetic Rubber Company

Numerous reports are afloat about a concern known as the Manchurian Synthetic Rubber Co., which, it is said, has the support of the Manchukuo Government and has the Bridgestone Tire Co., the Manchurian Electric Industrial Co., and the Manchurian Electro-Chemical Co. interested in it. The new concern, to be capitalized at 10,000,000 yen, will secure supplies of carbide from the Manchurian Electro-Chemical Co. A factory, under construction in Hsinking, is expected to be ready in August, 1939. It is planned to produce 25,000 tons of synthetic rubber in 1940.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for June, 1939:

Rubber Gross Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham.

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	4,059	471
United States	15,306	943
Continent of Europe	4,379	286
British possessions	2,949	54
Japan	2,168	14
Other countries	906	6
Totals	29,767	1,774

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	3,283	39
Dutch Borneo	1,949	..
Java and other Dutch islands.	345	..
Sarawak	1,044	..
British Borneo	92	3
Burma	465	6
Siam	1,496	183
French Indo-China	466	129
Other countries	64	3
Totals	9,204	363

CEYLON

Automobile tire casing imports by Ceylon in 1938 dropped to 27,563 units from 36,213 in 1937. Shipments from all sources, except France, declined.

FRANCE

(*Continued from page* 63)

accumulated in peace time, and if it became absolutely necessary to resort to synthetic rubbers, then the manufacture of products like "Thiokol" could be set up fairly quickly. France as a producer of natural rubbers, he further pointed out, should direct research toward the transformation of the molecule of natural rubber into a molecule with properties resembling those of artificial rubbers.

Mr. Jacobs in reply states that the question of the type of synthetic rubber to be produced has been answered abroad, the choice having fallen on butadiene rubber, and in a footnote he points out that not all foreign countries subsidize the production of synthetic rubber. As to chemical improvement of plantation rubber, Mr. Martin's suggestion is interesting, but solves nothing and leaves the matter where it was. With some bitterness Mr. Jacobs points out that while French chemists will no doubt think about the matter, France will fall behind and remain dependent on foreign countries which have a more progressive attitude toward synthetic rubber. The present low consumption of synthetic rubber in France, he says, is due to the high price (Perbunan costs about 90 francs a kilo), but consumption would automatically increase as soon as France began her own manufacture, and such manufacture, even if on a modest scale, would be profitable.

NEW ENGLAND

(*Continued from page* 59)

full year will receive a half week's vacation with pay. Workers employed two years in the past three and all with more than two years' steady employment records will receive a full week's vacation. Vacations are based on a forty-hour week at average earnings and will be staggered at the Pawtucket plant with no shutdown.

United States Rubber Co. Employes' Association, Bristol, R. I., will hold its fifth annual outing at Crescent Park on August 12. Winston Featherston is chairman of the general committee.

Patents and Trade Marks

MACHINERY

United States

2,162,563. **Golf Ball Molding Machine.** J. M. Oldham, assignor to L. A. Young, both of Detroit, Mich.
2,163,377. **Vulcanizer.** H. H. Hanson, assignor to Shaler Co., both of Waupun, Wis.
2,163,738. **Tire Shaping Tool.** M. Sainich, Livingston, Mont.
2,163,876. **Vulcanizing Clamp.** M. E. Hill, assignor to Holfast Rubber Co., both of Atlanta, Ga.
2,163,993. **Vulcanizer.** R. A. Dufour, Paris, and H. A. Leduc, Mantes-Gassicourt, both in France.
2,164,058. **Rubber Strip Making Device.** F. D. Fowler, Newton, assignor to Hood Rubber Co., Inc., Watertown, both in Mass.
2,164,241. **Fabric Spreader.** W. H. Hall, Jr., assignor to Thermoid Co., both of Trenton, N. J.
2,164,336. **Golf Ball Winder Tension Mechanism.** V. H. Meyer, Beverly, assignor to Sibley-Pym Corp., Lynn, both in Mass.
2,165,089. **Rubber Thread Manufacturing Apparatus.** C. L. Beal, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

Dominion of Canada

381,408. **Coil Making Apparatus.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of P. W. Lehman, Grosse Pointe Park, and G. F. Wikle, Ann Arbor, co-inventors, both in Mich., U. S. A.
382,158. **Tire Tread Slitter.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. Eger, Grosse Pointe Park, Mich., U. S. A.
382,159. **Shoe Upper Compacting Machine.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. R. Polleys, New Haven, Conn., U. S. A.
382,218. **Tire Cover Making Apparatus.** Dunlop Rubber Co., Ltd., London, and Francis Shaw & Co., Ltd., Manchester, assignees of H. Willshaw and W. A. Cowles, both of Birmingham, all in England.
382,324. **Tire Stitcher.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. F. Wikle, Ann Arbor, Mich., U. S. A.

Germany

676,187. **Device to Soften Artificial Leather.** Alkor-Werk Karl Lissmann, Solln.
676,326. **Golf Ball Spray.** Deutsche Dunlop Gummi Co. A.G., Hanau a.M.
676,441. **Roll to Roughen Tires.** P. Reinheimer, Munich.

PROCESS

United States

21,115. (Reissue.) **Ball.** H. T. Winterbauer, assignor, by direct and mesne assignments, to J. T. Clark Co., both of Chicago, Ill.
2,162,551. **Elastic Fabric.** T. G. Hawley, Jr., Naugatuck, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,163,289. **Sponge Rubber Coated Fabric.** J. Pennel, Roubaix, and J. Flipo, Croix, both in France.
2,163,681. **Flexible Cope.** C. K. Hansen, St. Paul, Minn.
2,163,784. **Treating Dipped Rubber Articles.** J. R. Gammeter, Akron, O.
2,163,986. **Rubber Process.** T. L. Shepherd, London, England.
2,164,164. **Carbon Black.** H. W. Price, assignor, by mesne assignments, to J. M. Huber Corp., both of Borger, Tex.
2,164,400. **Rubber Compositions.** E. O. Groskopf, Rutherford, N. J., assignor to Patent & Licensing Corp., New York, N. Y.
2,164,421. **Springing Element.** E. H. Piron, assignor to Transit Research Corp., both of New York, N. Y.
2,164,885. **Rubber Cap.** P. A. Raiche, North Providence, R. I.
2,165,099. **Perforate Rubber Sheet.** M. E. Hansen, assignor to American Anode, Inc., both of Akron, O.

Dominion of Canada

381,996. **Mat.** F. Watson, Winnipeg, Manitoba.
382,244. **Resilient Beaded Strip.** F. A. Best, Windsor, Ont.
382,459. **Label.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. J. Moskowitz, Wallington, and R. Emptage, Palisades Park, co-inventors, both in N. J., U. S. A.

United Kingdom

501,216. **Purifying Rubber.** Western Electric Co., Ltd., (Bell Telephone Laboratories, Inc.).
501,368. **Rubber Heel Molding.** Dunlop Rubber Co., Ltd., and R. J. Page.
501,436. **Treating Textiles.** R. Wallach.
501,478. **Molding Rubber.** Allmanna Svenska Elektriska Akt., and B. Hansson.
501,835. **Reducing Friction.** Siemens-Schuckertwerke A.G.
501,850. **Cable.** Standard Telephones & Cables, Ltd., (H. Sonnenfeld).
501,887. **Motor Vehicle Frame.** International Latex Processes, Ltd.
501,979 and 501,980. **Ball.** E. Miller.
502,733. **Microporous Film.** W. Binns.

Germany

675,145. **Perforated Rubber Sheet.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth, C. Weihe, and W. Schalk, all of Frankfurt a.M., and T. R. Koehnhorn, A. Mentzel, and P. Wirth, all of Berlin.
676,172. **Hose.** Harburger Gummiwaren-Fabrik Phoenix A.G., Harburg-Wilhelmsburg.
677,589. **Rubber-bonded Grinding Bodies.** Carborundum Co., Niagara Falls, N. Y., U. S. A. Represented by W. Dorn, Berlin.

CHEMICAL

United States

2,161,934. **Rubber-Resin Compositions.** W. E. Reichard, Elyria, and R. R. Olin, Akron, assignors to Worthington Ball Co., Elyria, both in O.
2,162,769. **Rubber Hydrochloride Sheet Material.** F. E. Williams, assignor to Marbon Corp., both of Gary, Ind.
2,162,924. **Chlorinated Rubber Composition.** D. H. Spitzli, Arlington, and R. L. Kennedy, Plainfield, both in N. J., assignors to Congoleum-Nairn, Inc., a corporation of N. Y.
2,163,243. **Chlorinated Rubber-Resin Composition.** J. A. Kenney, Plainfield, N. J., assignor to Barrett Co., New York, N. Y.
2,163,609. **Polymerized Chloroprene Adhesive Compositions.** A. D. Macdonald, Malden, assignor to B. B. Chemical Co., Boston, both in Mass.
2,163,610. **Adhesives.** A. D. Macdonald, Malden, assignor to B. B. Chemical Co., Boston, both in Mass.
2,163,611. **Adhesive Composition.** A. D. Macdonald, Malden, assignor to B. B. Chemical Co., Boston, both in Mass.
2,163,612. **Adhesives.** A. D. Macdonald, Malden, assignor to B. B. Chemical Co., Boston, both in Mass.
2,163,643. **Proteolytic Enzyme from Ficus Latex.** A. Walti, Westfield, assignor to Merck & Co., Inc., Rahway, both in N. J.
2,164,140. **Rubber Hydrochloride.** G. Mochizuki, Shiba-ku, Tokyo, assignor of one-half to M. Konishi, Saitama-Ken, both in Japan.
2,164,367. **Rubber Hydrochloride.** H. A. Winkelmann and E. W. Moffett, both of Chicago, and W. C. Calvert, Oak Park, both in Ill., assignors to Marbon Corp., a corporation of Del.
2,164,368. **Gasket Composition.** H. A. Winkelmann, assignor to Marbon Corp., both of Chicago, Ill.

United Kingdom

501,033. **Emulsified Swelling Agents.** J. Behre, H. Voss, R. Fromm, and J. Mau, (trading as Lehmann & Voss & Co.).
501,071. **Butadiene.** G. W. Johnson, (I. G. Farbenindustrie A.G.).
501,194. **Antioxidant.** E. W. Fawcett and Imperial Chemical Industries, Ltd.
501,239. **Rubber Hydrohalides.** G. C. Mack.
501,243. **Abrasive Binding Compositions.** United States Rubber Products, Inc.
501,476. **Mercapto Aryl Thiazoles.** Wingfoot Corp.
501,787. **Vulcanizing Agents.** Wingfoot Corp.
501,983. **Latex Ink.** H. Rinderknecht.
502,044. **Latex Coating Compositions for Colors.** A. T. B. Kell.
502,375. **Solvents.** W. W. Groves, (I. G. Farbenindustrie A.G.).
502,435. **Chlorinated Rubber Compositions for Fabric Printing.** Heberlein & Co., A.G.

502,609. **Latex Creaming Agent.** R. Haddan (Kelco Co.).
502,759. **Cellular Rubber-like Polymers.** Expanded Rubber Co., Ltd.

Germany

677,433. **Rubber-like Polymerization Products.** I. G. Farbenindustrie A.G., Frankfurt a.M.
677,471. **Electrical Insulation Substances.** Norddeutsche Seekabelwerke A.G., Nordenham.

GENERAL

United States

2,161,855. **Support.** D. K. Copell, New York, N. Y.
2,161,896. **Traffic Registering Mechanism.** C. D. Cutler, Delaware, assignor to Automatic Traffic Counter Co., Inc., Columbus, both in O.
2,161,902. **Shoe Welting.** A. C. Riley, Melrose, assignor to Cambridge Rubber Co., Cambridge, Mass.
2,162,020. **Hydrometer.** E. Johnson, assignor to E. A. Morsbach, both of Rockford, Ill.
2,162,073. **Football Practice Apparatus.** R. M. Evans, Des Moines, Iowa.
2,162,104. **Fluid Seal.** E. D. Mosher, assignor to National Oil Seal Co., both of Oakland, Calif.
2,162,157. **Baton.** E. L. Clark, Elkhart, Ind.
2,162,198. **Continuous - Track Tractor.** A. W. Herrington, assignor to Marmon-Herrington Co., Inc., both of Indianapolis, Ind.
2,162,332. **Sandblasting Stencil.** C. E. Frick, assignor, by mesne assignments, to Van Cleef Bros., both of Chicago, Ill., a partnership consisting of N., F., and P. Van Cleef.
2,162,395. **Gas Analyzer.** O. G. Bennett, assignor to Catalyst Research Corp., both of Pittsburgh, Pa.
2,162,483. **Bathing Device.** D. M. Kennedy, Rochester, N. Y.
2,162,603. **Tire Valve.** O. Bothe, Dusseldorf, Germany.
2,162,700. **Vehicle Track Chain.** J. K. Christmas, U. S. Army, Easton, Pa.
2,162,719. **Spring Bellows Control Device.** D. L. Hay, deceased, late of Washington, D. C., by M. K. Hay, executrix, Washington, D. C.
2,162,810. **Girdle.** R. H. Guinzburg, Flushing, assignor to I. B. Kleinert Rubber Co., New York, both in N. Y.
2,162,912. **Sole.** B. B. Craver, Waterbury, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,163,091. **Weighting Device for Golf Club Heads.** S. S. Held, assignor to Hillerich & Bradley Co., both of Louisville, Ky.
2,163,158. **Shoe.** H. Schröder, Budapest, Hungary.
2,163,262. **Electrolytic Cell.** H. E. Rhodes, Floral Park, assignor to Aerovox Corp., Brooklyn, both in N. Y.
2,163,347. **Belt.** E. Nassimbene, assignor to Gates Rubber Co., both of Denver, Colo.
2,163,423. **Stocking Protector.** D. Crichton, New York, N. Y.
2,163,464. **Pump.** D. Llewellyn, Huntington Park, Calif.
2,163,472. **Valve.** J. M. Shimer, assignor to Oil Well Supply Co., both of Dallas, Texas.
2,163,512. **Ice Creeper.** E. A. Castetter, Anderson, Ind.
2,163,623. **Clasp.** W. E. Olmstead, assignor to W. E. Hatheway, both of Bridgeport, Conn.
2,163,654. **Shirt Hold-Down Device.** R. A. Ziegler, Douglaston, L. I., and F. Ferguson, assignors to Cluett, Peabody & Co., Inc., both of Troy, both in N. Y.
2,163,790. **Protective Covering for Dead Ends.** O. C. Kerr, Long Beach, Calif.
2,163,795. **Float.** C. N. Merralls, Los Angeles, Calif.
2,163,890. **Non-skid Device.** J. C. Ryan, assignor of one-third to R. Bowlby and one-third to C. B. Lewis, all of Toronto, Ont., Canada.
2,163,894. **Hair Curler.** C. Seidel, Rochester, N. Y.
2,163,911. **Sanding Device.** J. B. Lintern, assignor to Lintern Corp., both of Cleveland, O.
2,163,932. **Casing Protector.** W. I. Bettis, Los Angeles, assignor to E. B. Kleaver, Burbank, both in Calif.
2,163,949. **Cymbal Holder.** F. F. Kiemle, Elmwood Park, Ill., assignor to C. G. Conn., Ltd., Elkhart, Ind.
2,163,996. **Laboratory Apparatus.** E. W. Flosdorf, Ardmore, assignor to Trustees of the University of Pennsylvania, Philadelphia, both in Pa.
2,164,136. **Foundation Garment.** J. Leonard, Allentown, Pa., assignor to Charis Corp., New York, N. Y.
2,164,162. **Type Bed.** E. C. Oliver, Adrian, Mich.
2,164,330. **Gas Mask Face Piece.** S. H. Katz, Edgewood Arsenal, and D. O. Burger, Belair, Md., assignors to the Government of the United States of America, as represented by the Secretary of War.
2,164,359. **Tape.** C. B. Strauch, New York, N. Y., assignor to Minnesota Mining & Mfg. Co., St. Paul, Minn.
2,164,360. **Wound Dressing.** C. B. Strauch, New York, N. Y., assignor to Minnesota Mining & Mfg. Co., St. Paul, Minn.
2,164,385. **Comb.** O. B. Carson, Scarsdale, assignor to American Hard Rubber Co., New York, both in N. Y.
2,164,387. **Hair Curler.** R. J. Crawford, Jersey City, N. J., assignor to American Hard Rubber Co., New York, N. Y.
2,164,485. **Slip Clutch Device.** R. C. Yantis, Dayton, O., assignor to General Motors Corp., Detroit, Mich.
2,164,580. **Pump.** J. G. Elmore, Macon, Ga.
2,164,617. **Brush.** R. Marvin, Richmond, Va.
2,164,655. **Stereopticon Slide Producing Apparatus.** B. J. Kleerup, Chicago, Ill.
2,164,686. **Tire.** F. R. McDevitt, Omaha, Nebr.
2,164,706. **Teat-Cup Lining.** H. M. Flint and J. E. Moe, assignors to Gates Rubber Co., all of Denver, Colo.
2,164,819. **Tire.** De W. T. Hicks, Waco, Tex., and V. L. Smithers, Akron, O.
2,164,858. **Submarine Sound System.** J. R. West, assignor to R. Williams, both of New York, N. Y.
2,164,886. **Water Tube for Rock Drills.** J. E. Renfer, Cleveland Heights, assignor to Cleveland Rock Drill Co., Cleveland, both in O.
2,164,981. **Electrical Conductor and Insulating Material Therefor.** S. W. Alderfer, assignor of one-half to E. D. Andrews, both of Akron, O.
2,165,012. **Knitted Fabric.** E. S. Sachsenmaier, assignor to Larkwood Silk Hosiery Mills, Inc., both of Charlotte, N. C.
2,165,150. **Shoe Cleaner.** H. C. and E. W. Parker, both of Washington, D.C.
2,165,155. **Propeller Shaft Support Bearing Unit.** A. H. Schmal, assignor to S K F Industries, Inc., both of Philadelphia, Pa.
2,165,185. **Wheel.** J. Suris, Habana, Cuba.

Dominion of Canada

381,965. **Pneumatic Structure.** H. S. Dixon, Dorking, England.
381,975. **Ski Boot Heel.** D. C. Hubbard, Auburn, Me., U. S. A.
382,022. **Receptacle Filling Device.** Cherry-Burrell Corp., Chicago, Ill., assignee of A. J. Lippold, Milwaukee, Wis., both in the U. S. A.
382,047. **Door Check.** Henney Motor Co., assignee of G. L. Runkle, both of Freeport, Ill., U. S. A.
382,063. **Railway Tire Plate.** Resilient Products Corp., assignee of T. W. Stedman, both of New York, N. Y., U. S. A.
382,075. **Welt Holddown for Sole Attaching Machines.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of C. H. Pepin, Beverly, Mass., U. S. A.
382,143. **Telephone Signalling Apparatus.** Associated Telephone & Telegraph Co., assignee of T. C. Risbe, both of Chicago, Ill., U. S. A.
382,168. **Tire.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of Firestone Park Trust & Savings Bank, Akron, O., U. S. A., Executor of the Estate of A. A. Bush, deceased, in his lifetime of Akron.
382,169. **Aircraft Undercarriage.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of R. W. Brown, Akron, O., U. S. A.
382,247. **Tire Pressure Signalling Apparatus.** G. D. Contri, Brescia, Italy.
382,255. **Atomizer.** J. Kampschulte, Osnabrück, Germany.
382,365. **Windshield Wiper.** Trico Products Corp., Buffalo, assignee of E. C. Horton, Hamburg, both in N. Y., U. S. A.
382,372. **Battery Grid Paster.** Willard Storage Battery Co., assignee of J. E. Brown and A. B. Clark, co-inventors, all of Cleveland, O., U. S. A.
382,373. **Nipple.** W. E. Adair, inventor, and E. A. Shaw, assignee of one-fourth of the interest, both of Prince Albert, Sask.
382,377. **Garment.** G. W. Rosenberg, Elkins Park, inventor, and J. Wolf, Philadelphia, assignee of fifty-one-hundredths of the interest, both in Pa., U. S. A.
382,402. **Golf Club Handle Grip.** H. L. Fletcher, London, England.
382,455. **Textile Machinery Hold-up.** Dayton Rubber Mfg. Co., assignee of H. M. Bacon, both of Dayton, O., U. S. A.
382,456. **Textile Machinery Picker.** Dayton Rubber Mfg. Co., assignee of H. M. Bacon, both of Dayton, O., U. S. A.
382,469. **Tire.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of J. E. Hale, Akron, O., U. S. A.
382,470. **Fluid Pressure Operated Control Mechanism.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, assignee of R. W. Brown, Akron, O., U. S. A.

382,472. **Gasoline Dispensing Nozzle.** Gates Rubber Co., assignee of G. W. Turman, both of Denver, Colo., U. S. A.
382,476. **De-Icer.** B. F. Goodrich Co., New York, N. Y., assignee of M. L. Taylor, Hudson, O., both in the U. S. A.

United Kingdom

500,231. **Safety Belt.** H. S. Crabtree.
500,247. **Resilient Support.** C. A. Voigt.
500,252. **Resiliently Mounted Airplane Engine.** P. C. A. M. D'Aubarede.
500,255. **Sealed Container for Medical Preparations.** Sharp & Dohme, Inc.
500,260. **Container Vent.** Dewey & Almy Chemical Co., Ltd.
500,286. **Resilient Support.** L. Harter.
500,287. **Stencilling Apparatus.** Rockware Glass Syndicate, Ltd., J. B. Murgatroyd, and J. G. Gregory.
500,293. **Loom Shuttle.** E. Kinsella.
500,373. **Door Fastening.** M. Mole & Son, Ltd., P. A. Mole, and C. S. W. Titmuss.
500,381. **Reservoir Pad.** N. F. M. Smith.
500,393. **Tire Valve.** Michelin & Cie.
500,396. **Liquid Measurer.** H. M. Bonnaud.
500,413. **Handle-Bar Muff.** J. W. Otten.
500,422. **Arch Support.** J. Krouman.
500,426. **Retractive Switch.** L. Quilliam.
500,434. **Inking-Pad.** C. F. Taylor.
500,464. **Nether Garment.** Atlas Underwear Co.
500,495. **Seam Ridge Pressing Machine.** British United Shoe Machinery Co., Ltd., (United Shoe Machinery Corp.)
500,499. **Shower Supporting Bracket.** J. E. Conklin.
500,501. **Universal Joint.** Hardy, Spicer & Co., Ltd., and W. E. Sparrow.
500,503. **Sponge Rubber.** H. R. Minor.
500,507. **Latch Mechanism.** S. B. and J. T. Atwood.
500,512. **Ball-Joint.** Chicago Rawhide Mfg. Co.
500,514. **Roller Skate.** G. Meister.
500,525. **Attaching Buckles to Gas Masks.** United-Carr Fastener Corp.
500,534. **Door.** E. G. Budd Mfg. Co.
500,538. **Resiliently Mounted Airplane Engine.** P. C. A. M. D'Aubarede.
500,562. **Box.** A. Astley.
500,565. **Taping Machine.** G. Horn and W. Lippold.
500,571. **Golf-Practicing Device.** J. M. Anderson and F. H. Hardy.
500,608. **Beverage Cooling Receptacle.** Firestone Tire & Rubber Co., Ltd.
500,610. **Vehicle Spring Suspension.** Vauxhall Motors, Ltd., and M. Olley.
500,638. **Motor-Cycle Spring Frame.** J. Krauss.
500,643. **Inflating Valve.** R. Tatham.
500,655. **Device for Vehicle Lamps, Etc.** A. Glanville, Jr., and F. W. Pope.
500,659. **Vehicle Lamp.** F. Hell.
500,660. **Engine Cooling System.** C. A. Voigt.
500,676. **Spring Surface.** G. A. Glomb, L. J. Veerman, K. Kuipers, H. Fokkens, E. Hoogstins, and P. Wijbenga.
500,679. **Screw Propeller.** E. Bugatti.
500,689. **Roadside Fender.** Soc. Italiana Pirelli.
500,692. **Pipe Coupling.** Scott & Fetzer Co.
500,700. **Pressing Apparatus.** A. Fischer-Schmutz.
500,725. **Hydraulic Apparatus.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., F. J. Tarris, and D. Webb.
500,726. **Screw-Thread Grinder.** S. A. Horstmann and Horstmann, Ltd.
500,741. **Polishing Molded Articles.** Thermo-Plastics, Inc.
500,750. **Vibrator.** C. H. Johnson & Sons, Ltd., J. A. Hartley, and J. W. Philippovic.
500,758. **Fountain Pen.** W. Read.
500,772. **Asbestos-Cement Pipe Making Machine.** J. Hardie & Co. Pty., Ltd.
500,778. **Switch.** British Thomson-Houston Co., Ltd.
500,784. **Paper Tube Cutter.** Celluloid Corp.
500,789. **Anaesthetic Apparatus.** H. W. Carsberg.
500,846. **Shutters for Ventilating Glass-houses.** J. Driffield.
500,852. **Souring Tool.** R. B. Kingman.
500,856. **Gun Mounting.** J. Martin and Martin-Baker Aircraft Co., Ltd.
500,867. **Lens Edge Groove Grinder.** A. F. Williams.
500,919. **Air Bomb.** A.G. Hunziker & Cie, Zurich, Baustoffabriken Brugg & Olten.
500,963. **Blasting Cartridge.** R. D. J. Owens and Imperial Chemical Industries, Ltd.
500,989. **Water-Sport Appliance.** F. St. A. Hartley.
500,997. **Hose Pipe.** G. S. Moulton & Co., Ltd., R. T. Glascodine, J. M. Chrystal, and S. S. Pickles.
501,006. **Engine Mounting.** E. P. and L. J. Renaux.
501,016. **Transformer.** B. A. G. Churcher, A. J. King, A. G. Ellis, and Metropolitan-Vickers Electrical Co., Ltd.
501,025. **Endless Belt and Chain Conveyer.** H. H. Chesny.
501,035. **Non-Refillable Bottle and Cask.** A. and J. Bertelli.
501,053. **Anaesthetic Administering Apparatus.** Coxeter & Son, Ltd., G. Wellesley, and W. Edmondson.
501,068. **Moving Vehicle Floor.** H. Kulhanek and G. L. Fisher.
501,078. **Vehicle Hood.** G. Salmons and A. H. Dalby-Balls.
501,085. **Match-Stand.** E. A. Bellow.
501,095. **Tire Valve.** Continental Gummi-Werke A. G. and H. Rommler.
501,108. **Hinge.** Junghans A. G., Geb.
501,151. **Stirrup.** C. L. Hughes (A. F. Hart).
501,161. **Means for Securing Engines to Beds.** Silentbloc, Ltd., and S. W. Jelley.
501,167. **Resilient Mounting.** Metalastik, Ltd., and M. Goldschmidt.
501,171. **Universal Joint.** P. C. A. M. D'Aubarede.
501,173. **Engine-Starter Pinion.** Briggs & Stratton Corp.
501,193. **Paper-Making Machine.** Paper Patents Co.
501,203. **Respiratory Appliance.** Bronzavia Soc. Anon.
501,228. **Strop.** X. Sprossler.

Germany

676,453. **Vibration Damper.** Continental Gummi-Werke A.G., Hannover.
677,532. **Vacuum Cleaner Tube.** Elektrolux A. G., Berlin-Tempelhof.
677,590. **Golf Ball.** Deutsche Dunlop Gummi Co. A.G., Hanau a.M.
677,674. **Teething Ring.** Vulkan Gummiwarenfabrik Weiss & Baessler, A.G., Leipzig-Lindenau.

TRADE MARKS

United States

367,562. Representation of a ball and bat containing the words: **"Official Hit-It."** Play sets including ball and bat. Sponge Rubber Products Co., Derby, Conn.
367,617. **Continental.** Carbon black. Continental Carbon Co., New York, N. Y.
367,654. **Guild-Built.** Tires. Oliver Tire & Rubber Co., Oakland, Calif.
367,671. **Quanto.** Quoit game. General Tire & Rubber Co., Akron, O.
367,706. **Incline Plane.** Testers. Henry L. Scott Co., Providence, R. I.
367,818. Representation of a valve stem encircled by a yellow band. Tire valve stems. Goodyear Tire & Rubber Co., Akron, O.
367,847. Representation of a label containing the words: "Surety-Pen." Fountain pens. G. Kapp, New York, N. Y.
367,874. **Rocket.** Storage batteries. Firestone Tire & Rubber Co., Akron.
367,890. **Kelly Springfield.** Tires and inner tubes. Kelly-Springfield Tire Co., Cumberland, Md.
367,893. Representation of a winged foot and the word: **"Goodyear."** Cushions, mattresses, arm rests, etc. Goodyear Tire & Rubber Co., Akron, O.
367,896. **Heatmaster.** Tire casings. Armstrong Rubber Co., Inc., West Haven, Conn.
367,932. A double circle containing representation of a three-pointed star, a leaf design and the words: **"Mercedes Benz."** Inner tubes and packings for sealing engine parts. Daimler-Benz A.G., Stuttgart-Unterturkheim, Germany.
367,959. **"Slimster Straight by Chevette."** Girdles, brassieres, etc. Chevette, Inc., New York, N. Y.
367,986. Representation of a label containing the word: **"Beauray."** Corsets, brassieres, etc. Ideal Linen Mesh Co., Poughkeepsie, N. Y.
368,093. Representation of a label containing the word: **"Vul-Cork."** Footwear. Cambridge Rubber Co., Cambridge, Mass.
368,003. **Adola.** Brassieres, corsets, etc. Fineform Brassiere Co., Inc., New York, N. Y.
368,032. **Gimbie.** Balls for sports. Gimbel Bros., Inc., New York, N. Y.
368,093. Representation of a label containing the word: **"Vulcohyde."** Golf balls. Walgreen Co., Chicago, Ill.
368,137. **Redwing.** Hose. Goodyear Tire & Rubber Co., Akron, O.
368,142. **Speedway.** Belts and belting. Goodyear Tire & Rubber Co., Akron, O.
368,150. **Fontaine.** Corsets. Union Co., Columbus, O.
368,151. **"Yoursize."** Girdles. Gem-Dandy Garter Co., Madison, N. C.
368,163. **Logan Health Garment.** Corsets and girdles. Logan Health Garment Co., Chicago, Ill.
368,176. **My-Te-Fine.** Hot water bottles, fountain syringes, and combination hot water bottle and syringe. F. Meyer, Inc., Portland, Ore.
368,179. **Korodless.** Battery cables. Bowes "Seal-Fast" Corp., Indianapolis, Ind.
368,195. **Safety Grip.** Tires. Western Auto Supply Co., Kansas City, Mo.

Editor's Book Table

NEW PUBLICATIONS

"Monsanto Magazine." July, 1939. Monsanto Chemical Co., St. Louis, Mo. 40 pages. The feature article in this month's issue of the firm's publication is entitled "Who Said Forty Was a Deadline?" This study investigates the alleged discrimination of industry to older workmen with particular reference to employment at Monsanto. The issue also contains an article on the acquisition of Resinox corporation, third largest manufacturer of phenol formaldehyde resins, by Monsanto and a summary of the firm's financial statement for the first three months of 1939.

"Machinery's Part in Future Social Progress." No. 32 in a Series of Booklet-Editorials by Allen W. Rucker in collaboration with N. W. Pickering, president, Farrel-Birmingham Co., Inc., Ansonia, Conn. 20 pages. In this study the authors assert that the present wave of anti-machine propaganda, which claims that unemployment is increased by technological developments involving the increased use of machinery, is based on fallacious assumptions. According to the booklet, displacement of labor at the point of machine use is more than counterbalanced by the addition of labor at the points of machine construction. The contrast between a dynamic and a static civilization is drawn, the authors pointing out that without increased productivity and therefore increased mechanization, it is impossible to achieve the triple goal of the American nation—expansion of population and families, improvement of living standards, and progress in cultural attainment.

"The New K-treated Waterproof Fabrics." The B. F. Goodrich Co., Akron, O. This illustrated six-page folder briefly discusses the properties and applications of fabrics treated with Koroseal. Among the many applications suggested for such fabrics are: raincoats, shower curtains, window curtains, drapes, aprons, and tablecloths.

"Aldanack." Aldan Rubber Co., Tioga & Salmon Sts., Philadelphia, Pa. Four pages. This publication, dated July, 1939, is the first issue of a new monthly house organ designed to further the knowledge, appreciation, and use of rubber. A more particular aim will be to acquaint readers with the advantages and uses of the firm's line of rubberized fabrics. This initial issue contains the first installment of a historical story on rubber, an article on lanital-"casein wool," and several brief items on the use of rubber.

"News about du Pont Rubber Chemicals." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. With this news letter dated June 28 is a 12-page report, No. 39-4, entitled, "The Significance of Accelerated Aging Tests for Rubber," by A. M. Neal. The fundamental factors affecting oxidation and the scientific basis for the selection of an accelerated aging test are discussed. The author also deals with the relative merits of existing tests with regard to service conditions.

"Green Book Buyers Directory," 1938-40 Edition. *Oil, Paint and Drug Reporter, Inc.*, 59 John St., New York, N. Y. 940 pages. The twenty-sixth annual edition of this directory brings up to date an informative service for industrial buyers and sellers in the chemical, oil, drug, and related industries. The directory which gives the name of the material, equipment, etc., followed by the name and address of the manufacturer is divided into five sections: (1) industrial materials; (2) industrial equipment, containers, and other supplies; (3) professional, technical, and commercial services; (4) trade-names and brand-names; (5) a record of United States imports and exports of the principal chemicals, and related materials for 1937 and 1938. Manufacturers of rubber and latex compounding ingredients and supplies are listed.

"Taxation and Capital Investment." James D. Magee. Published by The Brookings Institution, Washington, D. C. 64 pages. Price 50¢. This pamphlet on taxation in relation to investment analyzes the existing taxation system and explains why it must be substantially modified before an adequate flow of investment money into private enterprise can be expected. This study, preprinted because of current interest on the subject, is only a part of a comprehensive research project on "Capital Expansion, Employment, and Economic Stability," the results of which are scheduled for early autumn publication.

"Rubber and Latex in Furnishing & Decoration." *The Furnishing Trades' Organizer*, Drury House, Russell St., Drury Lane, London, W.C.2, England. 28 pages. This illustrated booklet is devoted to the use of rubber and latex for purposes of furnishing and decoration. Much attention is given to rubber flooring, mattresses, upholstery, and various products used in the home. Selling and display methods, adapted for products of this type, are also covered briefly.

BOOK REVIEWS

"In the Land of Rubber." Melicent Humason Lee. Published by Thomas Y. Crowell Co., 432 Fourth Ave., New York, N. Y. Cloth, 6⅝ by 8¾ inches, 99 pages. Price $1.75.

This book, written for children, is about Malaya. The author tells of the adventures of a native boy and girl whose homes were on the edge of a rubber plantation where they worked with their families. A trip to a coastal town, from where the rubber is shipped, leads them through the jungle where they see many strange plants and animals. Their thrills are climaxed by participation in a tiger killing upon their return to the plantation. Much authentic information about the rubber country is woven into this story, while a glossary at the end explains the Malay and technical words used.

"Rubber as an Engineering Material." The B. F. Goodrich Co., Akron, O. Cloth, 8½ by 11 inches, 25 pages.

Written for men who are dealing with materials and designing products, this handbook presents brief but concise information about rubber—its various forms, its properties, and limitations. Considerable space is devoted to the resistance of rubber to corrosion, abrasion, cutting, tearing, impact, heat, oil, and solvents. The elasticity of rubber and its use for vibration, shock, and noise isolation are discussed. One chapter deals with a comparison of the properties of the firm's elastic synthetics with the properties of rubber.

"Encyclopedie Technologique du Caoutchouc." Vol. II. Edited by André Bloc and Georges Genin. Published by the *Revue Générale du Caoutchouc*, Paris, France. Cloth, 6½ by 10 inches, 870 pages. Illustrated.

The first volume of this encyclopedia which consisted of three books covering, respectively, Preparation and Properties of Crude Rubber, Modern Trends in the Rubber Industry, and Testing Methods in the Rubber Industry, was reviewed in January, 1939.

The second and final volume contains Books IV and V. Book IV, Preparation of Compounds, is divided into seven chapters the first two of which, by F. Truchet, discuss "Organization and Operation," and "Laboratory and Factory Equipment." In Chapter III Henri Leduc explains "Radio-vulcanization" and its application. The remaining chapters are devoted to "Solvent Recovery in the Rubber Industry," by Georges Genin; "Compounding Ingredients," F. Jacobs;

"Regenerating Rubber and Rubber Reclaims," F. Kirchhof, and "Factices," Paul Alexander.

Book V, covering "Principal Manufactures," in 28 chapters discusses important applications of rubber, the method of manufacture, and the machinery used. In 80 pages J. E. Pattenheimer reviews the history of the pneumatic tire, the different types of tires, and the manufacturing processes and conditions of use. Then follow chapters on "Rubberized Fabrics," by A. Trepau; "Transmission and Conveyer Belting," Werner Esch, with a note on rayon used in conveyer belting in Germany; "Rubber Hose," Paul H. Mensier; "Rubber Pavings," and "Surfacing for Buildings," by Fernand Jacobs; "Tennis and Golf Balls," S. G. Ball; "Artificial Leathers and Skins," Yves Cornic, including foreign patents; "Cellular Rubber with Closed Pores," P. Loeffler; "Spongy Rubber," Gaston Cany and Henri Leduc; "Rubber Thread," R. G. James. The rest of the book deals with rubber insulations, ebonite, rubber united to metal, rings and seals for cans, rubber sheet for various purposes, shoes and soles, dental rubber, cements and adhesives, rubber in paints, gas masks, erasers, adhesive fabrics, asbestos and other packing containing rubber, brake lining, grinding wheels, rubber in printing, and the fireproofing of rubber.

The volume closes with an index of authors and one of the subjects treated, both by G. Genin.

Two Fast-Curing Accelerators

Two new fast-curing accelerators, "R-N-2 Crystals" and "R-2 Crystals," were recently announced by the Monsanto Chemical Co., Akron, O.

"R-N-2 Crystals," the reaction product of carbon bisulphide with methylene di-(N-methylcyclohexylamine), is an exceptionally fast curing accelerator, giving excellent cures with low sulphur content and at low temperatures. It is used in liquid latex and fast curing cements. For use in latex compounding the accelerator is easily emulsified. Readily soluble in naphtha, benzol, etc., solutions containing "R-N-2 Crystals" can be added directly to a cement containing all other ingredients and thus obviate the necessity of split batch mixing. Properties of the accelerator include: appearance, light tan coarse crystalline solid; specific gravity, 1.11; flash point, 300° F.; melting point, between 55° and 65° C.

"R-2 Crystals," a similar-type product, is the reaction product of carbon bisulphide with methylene dipiperidine. It is an ultra-accelerator for curing liquid latex, cements, etc., and for such purposes it is readily emulsified and is soluble in the usual rubber solvents. The properties are the same as in the case of "R-N-2 Crystals" with the exception of the melting point, which is slightly lower, between 50° and 60° C.

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Market Reviews

CRUDE RUBBER

Commodity Exchange

Tabulated Week-End Closing Prices

Futures	May 27	June 24	July 1	July 8	July 15	July 22
June ...	16.34	16.27	.....	.....	.....	.....
July	16.39	16.29	16.36	16.31	16.45	16.60
Sept. ...	16.40	16.36	16.35	16.36	16.52	16.65
Dec. ...	16.45	16.39	16.35	16.42	16.61	16.71
Mar. ...	16.48	16.45	16.40	16.45	16.63	16.75
May ...	.....	16.49	16.42	16.49	16.64	16.77
June ...	.....	.....	.....	16.51	16.65	16.78
Volume per week (tons)..	6,510	5,450	10,210	4,230	8,500	12,800

New York Quotations

New York outside market rubber quotations in cents per pound

	July 27, 1938	June 27, 1939	July 26, 1939
Plantations			
Rubber latex..*gal.*	59/60	60/61	61/62
Paras			
Upriver fine	15	14⅜	14¼
Upriver fine	*16½	*16⅝	*16¾
Upriver coarse...	9	10	10
Upriver coarse...	*14	*15¼	*15¼
Islands fine......	15	14	14½
Islands fine......	*16½	*16¼	*17
Acre, Bolivian fine	15	14½	14½
Acre, Bolivian fine	*16½	*16¾	*17
Beni, Bolivian fine	15½	15	15
Madeira fine	15	14⅜	14½
Caucho			
Upper ball.......	9½	10	10
Upper ball.......	*14	*15¼	*15¼
Lower ball.......	9	9½	9¾
Pontianak			
Pressed block ...	11/23	9/16	9/16
Guayule			
Duro, washed and dried	12	13	13
Ampar	12½	13¼	13¼
Africans			
Rio Nuñez	17	14	15⅛
Black Kassai ...	16½	14	15⅛
Prime Niger flake.	25	25	25
Gutta Percha			
Gutta Siak	12	9¾	9½
Gutta Soh	14½	15	14¾
Red Macassar..	1.10/1.20	90/1.20	90/1.20
Balata			
Block, Ciudad Bolivar	..	..	..
Manaos block ...	29	31	30
Surinam sheets...	37	40	42
Amber	39	42	44

*Washed and dried crepe. Shipments from Brazil.

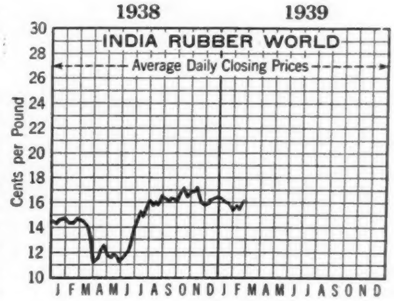
THE Commodity Exchange table published here shows prices of representative future contracts of the New York market for the last two months.

Optimistic trade news, the advance of the securities market, and heavy buying by factory interests were important factors in strengthening the rubber market during the past month. Closing at 16.35¢ per pound on June 30, the price of December futures held firm until mid-July when it moved upward to close at 16.91¢ per pound, a new high for the year, on July 18. Thereafter the price was somewhat easier, closing at 16.71¢ on July 21. The closing price on July 26 was 16.55¢ per pound.

Crude rubber consumption in the United States of 47,259 tons during June exceeded general trade expectations by a sizable amount. Most estimates had been in the neighborhood of 45,000 tons. With reports of current high activity in the industry, but with allowance made for early July shutdowns and holidays, consumption during July should be in the neighborhood of 41,000 tons. Currently the replacement tire business is absorbing large amounts of rubber; the insulated wire industry is reported as picking up after months of inactivity; mechanical goods manufacture is also active. If anticipated business in connection with the 1940 automobile models is realized, the consumption figure for August should come up to the June level. In addition to new equipment tires, a large volume of rubber will be used in making rubber automotive parts. Most significant in regard to the latter will be the extended use of latex foam rubber cushioning.

World stocks outside regulated areas at the end of May amounted to 397,648 tons, according to the *Statistical Bulletin of the International Rubber Regulation Committee*. This amounts to 4.7 months' supply on the basis of the previous 12 months' world absorption. Stocks of 181,794 tons in the United States at the end of June represent only 4.0 months' supply at the rate of consumption during the previous three months.

At its meeting on July 25 the I. R. R. C. raised the export quota for the second half of 1939 to 60% of basic quotas. It was decided provisionally to meet early in September if in the meantime the British government requested a release of rubber in connection with its barter agreement with the United States.



New York Outside Market—Spot Ribbed Smoked Sheets

New York Outside Market

Demand for physical rubber was better during July with dealers in the outside market reporting increased factory and shipment business. Factory accounts were steady buyers. Market activity was notably brisk at mid-month when prices strengthened in company with the futures market. The price of No. 1 ribbed smoked sheets closed at 16 7/16¢ per pound on July 3, holding steady until the middle of the month when it advanced to close at 16⅞¢ on July 18, a high for the year. Following this the price was easier, closing at 16 11/16¢ on July 21. The closing price on July 26 was 16 9/16¢ per pound.

The week-end closing prices on No. 1 ribbed smoked sheets follow: July 1, 16½¢; July 8, 16½¢; July 15, 16⅝¢; and July 22, 16 11/16¢.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	June, 1939 26	27	28	29	30	July, 1939 1*	3	4†	5	6	7	8*	10	11	12	13	14	15*	17	18	19	20	21	22*
No. 1 Ribbed Smoked Sheet	16 9/16	16½	16½	16½	16½	..	16 7/16	..	16 7/16	16½	16½	..	16½	16½	16 9/16	16 9/16	16⅝	..	16¾	16⅞	16¾	16 11/16	16 11/16	..
No. 1 Thin Latex Crepe...	18¼	18 3/16	18 3/16	18 3/16	18 3/16	..	18⅛	..	18⅛	18 3/16	18 3/16	..	18 3/16	18 3/16	18¼	18¼	18 5/16	..	18 7/16	[illegible]	18 7/16	18⅜	18⅜	..
No. 2 Thick Latex Crepe..	19 1/16	19	19	19	19	..	18 15/16	..	18 15/16	19	19	..	19	19	19 1/16	19 1/16	19⅛	..	19¼	19⅜	19¼	19 3/16	19 3/16	..
No. 1 Brown Crepe......	16 3/16	16⅛	16⅛	16⅛	16⅛	..	16 1/16	..	16 1/16	16⅛	16⅛	..	16⅛	16⅛	16 3/16	16 3/16	16¼	..	16⅜	16½	16⅜	16 5/16	16 5/16	..
No. 2 Brown Crepe......	16 1/16	16	16	16	16	..	15 15/16	..	15 15/16	16	16	..	16	16	16 1/16	16 1/16	16⅛	..	16¼	16⅜	16¼	16 3/16	16 3/16	..
No. 2 Amber.............	16 3/16	16⅛	16⅛	16⅛	16⅛	..	16 1/16	..	16 1/16	16⅛	16⅛	..	16⅛	16⅛	16 3/16	16 3/16	16¼	..	16⅜	16½	16⅜	16 5/16	16 5/16	..
No. 3 Amber.............	16 1/16	16	16	16	16	..	15 15/16	..	15 15/16	16	16	..	16	16	16 1/16	16 1/16	16⅛	..	16¼	16⅜	16¼	16 3/16	16 3/16	..
Rolled Brown	14⅞	14 13/16	14 13/16	14 13/16	14 13/16	..	14¾	..	14¾	14 13/16	14 13/16	..	14 13/16	14 13/16	14⅞	14⅞	14 15/16	..	15 1/16	15 3/16	15 1/16	15	15	..

*Closed. †Holiday.

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption¶ Tons	U. S. Stocks Mfgrs., Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.—Public Warehouses, London Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1937	584,851	543,600	262,204	63,099	57,785	44,792	1,139,800	1,104,991	a639,021
1938	400,178	437,031	231,500	45,105	86,853	27,084	894,955	941,148	586,776
1938									
Jan.	42,135	31,265	276,497	57,356	62,108	48,494	80,339	70,141	636,246
Feb.	43,930	25,357	292,067	47,459	71,516	46,241	81,178	63,951	651,520
Mar.	35,967	32,389	301,762	41,882	76,617	50,797	82,024	80,467	672,922
Apr.	30,807	29,730	303,901	39,071	82,754	40,614	87,235	71,613	670,905
May	27,410	30,753	300,907	32,859	87,215	40,598	65,152	78,418	654,516
June	26,011	32,540	294,796	32,079	92,312	44,729	71,195	72,310	670,298
July	22,918	34,219	282,785	40,400	95,252	45,529	80,208	74,305	668,744
Aug.	31,099	40,552	273,841	47,772	99,614	41,002	75,212	75,780	651,082
Sept.	37,374	40,183	268,094	48,927	98,140	35,386	71,212	80,143	637,886
Oct.	34,496	42,850	259,074	51,062	93,272	34,901	75,879	88,617	623,717
Nov.	31,054	49,050	242,592	51,114	90,073	31,255	67,370	94,465	592,545
Dec.	36,977	48,143	231,500	45,105	86,853	27,084	57,951	90,938	586,776
1939									
Jan.	39,082	46,234	223,879	48,210	80,643	30,975	87,497	88,941	584,429
Feb.	36,490	42,365	217,534	55,814	75,517	28,559	77,646	83,711	568,780
Mar.	38,989	50,165	205,936	55,981	72,235	23,255	77,039	95,335	545,459
Apr.	29,601	44,166	190,896	57,918	68,931	22,434	73,865	86,855	518,650
May	47,535	44,377	193,602	54,046	66,020	20,849	70,587	85,834	......
June	35,947	47,259	181,794	51,274	......	......	......	......	......

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. a Include stocks from Japan.

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption†	Consumption % to Crude	U. S. Stocks*	Exports
1937	185,033	162,000	29.8	28,800	13,233
1938	122,403	120,800	27.6	23,000	7,403
1939					
Jan.	14,826	13,743	29.7	23,334	748
Feb.	14,102	13,347	31.5	23,461	630
Mar.	15,647	16,197	32.3	22,155	756
Apr.	14,527	13,391	30.3	22,628	748
May	14,769	13,517	30.5	22,771	1,008
June	15,871	14,870	31.5	23,058	...

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage.
Compiled by The Rubber Manufacturers Association, Inc.

ACCORDING to R. M. A. figures, June reclaimed rubber consumption is estimated at 14,870 long tons, 9.1% higher than that of May; production at 15,871 long tons; and stocks on hand June 30, 23,058 long tons. The demand for reclaim during July continued active, and it is expected that consumption may be nearly that of June. More reclaim has been used in relation to crude rubber consumption this year than in 1938. Demand from replacement tire, mechanical goods, and automotive rubber goods manufacture is reported good. Increased demand from insulated wire manufacturers has been noted during the period under review.

The market continues steady, with prices holding steady at last month's levels. With the price of crude rubber advancing somewhat present reclaim prices are felt to be particularly favorable for consumers.

New York Quotations

July 24, 1939

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¼
Acid	1.18-1.22	7 / 7¼
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
No. 1 Floating	1.00	12 /12½
Compound	1.10-1.20	8 / 8¾
Red Tube	1.15-1.30	8 / 8¼
Miscellaneous		
Mechanical Blends ...	1.25-1.50	4½/ 5
White	1.35-1.50	11½/12

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
July 1..................	42,376	21,234
July 8..................	41,488	20,405
July 15..................	41,028	20,053
July 22..................	39,074	19,232

CRUDE rubber consumption by United States manufacturers during June is estimated at 47,259 long tons, against 44,377 long tons during May, a 6.5% increase, and 45.2% over the 32,540 (revised) long tons consumed in June, 1938, according to R.M.A. statistics.

Gross imports of crude rubber for June are reported to be 35,947 long tons, 24.4% under the May figure of 47,535 long tons, but 38.2% over the 26,011 long tons imported in June, 1938.

Domestic stocks of crude rubber on hand June 30 totaled 181,794 long tons, compared with May 31 stocks of 193,602 long tons and 294,796 (revised) long tons on hand June 30, 1938.

Crude rubber afloat to United States ports as of June 30 is estimated at 51,274 long tons, against 54,046 long tons afloat on May 31 and 32,079 long tons afloat on June 30, 1938.

RUBBER SCRAP

THE demand for scrap rubber during July was reported as very good, with indications of continued activity during the next two or three months. Current optimism is based on present activity in the rubber industry coupled with anticipated demand for rubber products by the automotive industry with the advent of new model production next month.

The market is steady; all grades of scrap rubber with the exception of three remain at last month's levels. No. 2 compound inner tubes advanced ⅛¢ per pound; black auto peelings increased $2 per ton; while black mechanicals are up $4.50 to $5 per ton.

CONSUMERS' BUYING PRICES

(Carload Lots for July 24, 1939)

		Prices
Boots and Shoes		
Boots and shoes, black....	*lb.*	$0.01 /$0.01⅛
Colored	*lb.*	.00¾/ .00⅞
Untrimmed arctics	*lb.*	.00¼/ .00⅞
Inner Tubes		
No. 1, floating............	*lb.*	.08½/ .09
No. 2, compound..........	*lb.*	.03¾/ .03⅞
Red	*lb.*	.03½/ .03¾
Mixed tubes	*lb.*	.03½/ .03⅝
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	*ton*	11.50 /12.00
Beadless	*ton*	15.00 /16.00
Auto tire carcass.......	*ton*	20.00 /22.00
Black auto peelings.....	*ton*	22.00 /23.00
Solid		
Clean mixed truck.....	*ton*	27.00 /28.00
Light gravity	*ton*	35.00 /36.00
Mechanicals		
Mixed black scrap	*ton*	20.00 /22.00
Hose, air brake..........	*ton*	20.00 /22.50
Garden, rubber covered.	*ton*	10.00 /12.50
Steam and water, soft..	*ton*	10.00 /12.50
No. 1 red..................	*lb.*	.02½/ .02¾
No. 2 red..................	*lb.*	.02¼/ .02½
White druggists' sundries..	*lb.*	.03¾/ .04
Mixed mechanicals.........	*lb.*	.02¼/ .02½
White mechanicals	*lb.*	.03⅝/ .03⅞
Hard Rubber		
No 1 hard rubber	*lb.*	.11 / .11½

COMPOUNDING INGREDIENTS

DEMAND for compounding ingredients during July was generally very good with activity in the rubber industry at a higher level than during June. Replacement tire business has been sustained, and other lines of rubber manufacturing activities are reported active. The outlook for August and September is favorable, with increased activity expected as a result of demand for equipment tires and automotive parts for the 1940 model automobiles. Prices of compounding ingredients in general hold at last month's quotations. Titanium pigments, however, were reduced somewhat on July 1.

CARBON BLACK. The demand for carbon black was at a good rate during the past month. Smaller tire manufacturers were largely responsible for the strength of the black market for the early part of July, but later in the month buying by major tire producers added firmness. Factory inventories were reported as fairly low. The price remains unchanged.

Black production in Texas during May totaled 1,241,177 pounds, against 1,214,296 pounds in April and 1,010,289 pounds in May, 1938.

FACTICE OR RUBBER SUBSTITUTE. There has been a decided increase in the demand during July, with prices holding substantially unchanged.

LITHARGE. Prices advanced five points toward the latter part of June. New quotations in car lots are 6.35 to 6.60¢ per pound for delivery in barrels. Demand was fairly steady, but not very brisk.

RUBBER CHEMICALS. The demand for accelerators and antioxidants was active last month. Prices continue substantially unchanged.

RUBBER SOLVENTS. With tire manufacturers buying briskly, large gallonages of these solvents moved into consumption during July, and inquiries indicated a strong market for several weeks to come. The price is firm and unchanged. Volume for the first five months of this year is estimated at about 25% more than the comparable period last year.

TITANIUM PIGMENTS. The demand has continued at a very satisfactory level, with tire and sundries manufacturers particularly active.

Prices on all grades of material, effective July 1, were lowered somewhat. Regular and chalk-resistant titanium dioxides were reduced 1¢ per pound to 13¢ and 16¢ per pound, respectively, in car lots for delivery in bags. Titanium pigments with a barium, calcium, or magnesium base were reduced 3/8¢ per pound to sell at 5¼¢ in car lots for delivery in bags. The price reductions reflected a stimulated interest, but a greater effect is expected to develop gradually.

ZINC OXIDE. Withdrawals continued in good volume during July, with market firmness expected to continue for the next few months. Prices are unchanged and are expected to hold at current levels at least through the third quarter.

New York Quotations

July 24, 1939

Prices Not Reported Will Be Supplied on Application

Abrasives			
Pumicestone, powdered	*lb.*	$0.03	/$0.035
Rottenstone, domestic	*lb.*	.03	/ .035
Silica, 15	*ton*	38.00	
Accelerators, Inorganic			
Lime, hydrated, l.c.l., New York	*ton*	20.00	
Litharge (commercial)	*lb.*	.0675	/ .0725
Accelerators, Organic			
A-1	*lb.*	.24	/ .30
A-10	*lb.*	.31	/ .35
A-11	*lb.*	.52	/ .65
A-19	*lb.*	.52	/ .65
A-32	*lb.*	.70	/ .80
A-77	*lb.*	.42	/ .55
A-100	*lb.*	.42	/ .55
Accelerator 49	*lb.*	.42	
737	*lb.*	.42	/ .43
737-50	*lb.*	.25	/ .26
808	*lb.*	.70	/ .72
833	*lb.*	1.15	
Acrin	*lb.*	.60	
Aldehyde ammonia	*lb.*	.70	
Altax	*lb.*	.55	/ .70
B-J-F	*lb.*	.50	/ .55
Beutene	*lb.*	.70	/ .75
Butyl Zimate	*lb.*	2.50	
C-P-B	*lb.*	2.00	
Captax	*lb.*	.50	/ .60
Crylene	*lb.*	.40	/ .47
Paste	*lb.*	.30	/ .36
D-B-A	*lb.*	2.00	
Delac A	*lb.*	.40	/ .50
O	*lb.*	.40	/ .50
P	*lb.*	.40	/ .50
Di-Esterex	*lb.*	.60	/ .70
N	*lb.*	.60	/ .70
DOTG (Di-ortho-tolylguanidine)	*lb.*	.44	/ .46
DPG (Diphenylguanidine)	*lb.*	.35	/ .45
El-Sixty	*lb.*	.50	/ .65
Ethylideneaniline	*lb.*	.42	/ .43
Ethyl Zimate	*lb.*	2.50	
Formaldehyde P.A.C.	*lb.*	.0625	
Formaldehydeaniline	*lb.*	.31	
Formaldehyde-para-toluidine	*lb.*	.52	/ .54
Guantal	*lb.*	.40	/ .50
Hepteen	*lb.*	.35	/ .40
Base	*lb.*	1.35	/ 1.50
Hexamethylenetetramine U.S.P.	*lb.*	.39	
Technical	*lb.*	.33	
Lead oleate, No. 999	*lb.*	.13	
Witco	*lb.*	.15	
Monex	*lb.*	$2.25	
Novex	*lb.*		
O. N. V.	*lb.*	1.00	/$1.10
O-X-A-F	*lb.*	.50	/ .55
Ovac	*lb.*	.50	/ .55
Para-nitroso-dimethylaniline	*lb.*	.85	
Pentex	*lb.*	1.00	/ 1.10
Flour	*lb.*	.15	/ .16
Pip-Pip	*lb.*	2.50	
Pipsolene	*lb.*	1.55	/ 1.85
R-2	*lb.*	1.40	/ 1.80
R-23	*lb.*	40	
R & H 50-D	*lb.*	.42	/ .43
Rotax	*lb.*	.60	/ .65
Safex	*lb.*	1.20	/ 1.30
Santocure	*lb.*	.80	/ 1.00
Super-sulphur No. 1	*lb.*	.50	
2	*lb.*	.18	/ .25
Tetrone A	*lb.*	2.70	
Thiocarbanilide	*lb.*	.24	
Thionex	*lb.*	2.35	
Trimene	*lb.*	.55	/ .65
Base	*lb.*	1.05	/ 1.20
Triphenylguanidine (TPG)	*lb.*	.45	
Tuads	*lb.*	2.35	
Ureka	*lb.*	.60	/ .75
Blend B	*lb.*	.60	/ .75
C	*lb.*	.56	/ .65
Vulcanex	*lb.*	.42	/ .43
Vulcanol	*lb.*	.85	
Z-B-X	*lb.*	2.50	
Zenite	*lb.*	.46	/ .48
A	*lb.*	.53	/ .55
B	*lb.*	.46	/ .48
Zimate	*lb.*	2.35	
Activator			
Aero Ac 50	*lb.*		
Barak	*lb.*	.50	
Age Resisters			
AgeRite Alba	*lb.*	1.50	/ 2.00
Exel	*lb.*	1.00	/ 1.40
Gel	*lb.*	.57	/ .75
Hipar	*lb.*	.65	/ .92
Powder	*lb.*	.52	/ .65
Resin	*lb.*	.52	/ .65
D	*lb.*	.52	/ .65
White	*lb.*	1.25	/ 1.65
Akroflex C	*lb.*	.56	/ .58
Albasan	*lb.*	.70	/ .75
Aminox	*lb.*	.52	/ .61
Antox	*lb.*	.56	
B-L-E	*lb.*	.52	/ .61
Powder	*lb.*	.65	/ .74
B-X-A	*lb.*	.55	/ .61
Copper Inhibitor X-872-A	*lb.*	$1.15	
Flectol B.	*lb.*	.52	/$0.65
H	*lb.*	.52	/ .65
White	*lb.*	.90	/ 1.15
M-U-F	*lb.*	1.50	
Neozone (standard)	*lb.*	.63	
A	*lb.*	.52	/ .54
B	*lb.*	.63	
C	*lb.*	.52	/ .54
D	*lb.*	.52	/ .54
E	*lb.*	.63	
Oxynone	*lb.*	.64	/ .80
Parazone	*lb.*	.68	
Permalux	*lb.*	1.20	
Santoflex B	*lb.*	.52	/ .65
Solux	*lb.*	1.30	
Thermoflex A	*lb.*	.65	/ .67
V-G-B	*lb.*	.52	/ .61
Alkalies			
Caustic soda, flake, Columbia (400 lb. drums)	*100 lbs.*	2.70	/ 3.55
liquid, 50%	*100 lbs.*	1.95	
solid (700 lb. drums)	*100 lbs.*	2.30	/ 3.15
Antiscorch Materials			
A-F-B	*lb.*	.35	/ .40
Antiscorch T	*lb.*	.90	
E-S-E-N	*lb.*	.35	/ .40
R-17 Resin (drums)	*lb.*	.10	
RM	*lb.*	1.25	
Retarder W	*lb.*	.36	
U.T.B.	*lb.*	.35	/ .40
Antisun Materials			
Heliozone	*lb.*	.21	
Sunproof	*lb.*	.20	/ .25
Colors			
BLACK			
Du Pont powder	*lb.*	.42	/ .44
Lampblack (commercial)	*lb.*	.15	
BLUE			
Brilliant	*lb.*		
Du Pont dispersed	*lb.*	.83	/ 3.60
Powders	*lb.*	2.25	/ 3.75
Prussian	*lb.*	.0375	
Toners	*lb.*	.08	/ 3.85
BROWN			
Mapico	*lb.*	.11	
GREEN			
Brilliant	*lb.*		
Chrome, light	*lb.*		
medium	*lb.*	.22	
oxide (freight allowed)	*lb.*		

GREEN (*Cont'd*)

Dark	lb.	
Du Pont dispersed	lb.	$0.98 / $1.75
Powders	lb.	1.00 / 2.00
Guignet's, Easton, Pa., bbls.	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.75

ORANGE

Du Pont dispersed	lb.	.88 / .90
Powders	lb.	.80 / 2.50
Lake	lb.	
Toners	lb.	.40 / 1.60

ORCHID

Toners	lb.	1.50 / 2.00

PINK

Toners	lb.	1.50 / 2.00

PURPLE

Permanent	lb.	
Toners	lb.	.60 / 2.10

RED

Antimony		
Crimson, 15/17%	lb.	.45
R. M. P. No. 3	lb.	.48
Sulphur free	lb.	.50
R.M.P.	lb.	.52
Golden 15/17%	lb.	.28
7-A	lb.	.37
Z-2	lb.	.23
Aristi	lb.	1.75
Cadmium, light (400 lb. bbls.)	lb.	.70 / .75
Chinese	lb.	
Crimson	lb.	
Du Pont dispersed	lb.	.93 / 2.05
Powders	lb.	.52 / 1.05
Mapico	lb.	.0925
Medium	lb.	
Rub-Er-Red, Easton, Pa., bbls.	lb.	.0925
Scarlet	lb.	
Toners	lb.	.08 / 2.00

WHITE

Lithopone (bags)	lb.	.0375/ .04
Albalith Black Label-11	lb.	.0375/ .04
Astrolith	lb.	.0375/ .04
Azolith	lb.	.0375/ .04
Cryptone-BA-19	lb.	.0525/ .055
BT	lb.	.0525/ .055
CB	lb.	.0525/ .055
ZS No. 20	lb.	.075 / .0775
86	lb.	.07¾/ .08⅛
230	lb.	.07¾/ .08⅛
Sunolith	lb.	.0375/ .04
Ray-Bar	lb.	.0525/ .0625
Ray-Cal	lb.	.0525/ .0625
Rayox	lb.	.13 / .16
Titanolith (5-ton lots)	lb.	.0525/ .055
Titanox-A (50-lb. bags)	lb.	.13 / .1375
B (50-lb. bags)	lb.	.0525/ .055
30 (50-lb. bags)	lb.	.0525/ .055
C (50-lb. bags)	lb.	.0525/ .055
M (50-lb. bags)	lb.	.0525/ .055
Ti-Tone	lb.	
Zinc Oxide		
Azo ZZZ-11	lb.	.0625/ .065
44	lb.	.0625/ .065
55	lb.	.0625/ .065
66	lb.	.0625/ .065
French Process, Florence		
White Seal-7 (bbls.)	lb.	.085 / .0875
Green Seal-8	lb.	.08 / .0825
Red Seal-9	lb.	.075 / .0775
Kadox, Black Label-15	lb.	.065 / .0675
No. 25	lb.	.075 / .0775
Red Label-17	lb.	.065 / .0675
Horse Head Special 3	lb.	.0625/ .065
XX Red-4	lb.	.0625/ .065
23	lb.	.0625/ .065
72	lb.	.0625/ .065
78	lb.	.0625/ .065
80	lb.	.0625/ .065
103	lb.	.0625/ .065
110	lb.	.0625/ .065
St. Joe (lead free)		
Black Label	lb.	.0625/ .065
Green Label	lb.	.0625/ .065
Red Label	lb.	.0625/ .065
U.S.P.	lb.	.095 / .0975
White Jack	lb.	.075 / .0775
Zopaque	lb.	.13 / .1475

YELLOW

Cadmolith (cadmium yellow), 400 lb. bbls.	lb.	.45 / .50
Du Pont dispersed	lb.	1.25 / 1.75
Powders	lb.	1.55 / 1.37
Lemon	lb.	
Mapico	lb.	.0675
Toners	lb.	2.50

Dispersing Agents

Darvan	lb.	.30 / .47
Nevoll (drums)	lb.	.0215
Santomerse S	lb.	.11 / .25

Fillers, Inert

Asbestine, c.l., f.o.b., mills	ton	15.00
Barytes	ton	30.00 /36.00
f.o.b., St. Louis (50 lb. paper bags)	ton	22.85
off color, domestic	ton	20.00 /25.00
white, imported	ton	29.00 /32.00
Blanc fixe, dry, precip.	lb.	.03 / .035
Calcene	ton	37.50 /43.00
Infusorial earth	lb.	$0.02 /$0.03
Kalite No. 1	ton	24.00 /50.00
3	ton	34.00 /60.00
Magnesia, calcined, heavy	lb.	.04
Carbonate, l.c.l.	lb.	.07 / .095
Pyrax A	ton	6.50 /20.00
Whiting		
Columbia Filler	ton	9.00 /14.00
Guilders	100 lbs.	
Hakuenka	lb.	
Paris white, English cliff-stone	100 lbs.	
Southwark Brand, Commercial	100 lbs.	
All other grades	100 lbs.	
Suprex, white extra light	ton	45.00 /60.00
heavy	ton	45.00 / 60.00
Witco, c.l.	ton	6.00

Finishes

Rubber lacquer, clear	gal.	
colored	gal.	
Starch, corn, pwd.	100 lbs.	
potato	lb.	
Talc	ton	25.00 /45.00

Flock

Cotton flock, dark	lb.	.105 / .13
dyed	lb.	.45 / .85
white	lb.	.12 / .18
Rayon flock, colored	lb.	1.10 / 1.50
white	lb.	.90

Latex Compounding Ingredients

Accelerator 85	lb.	.35
89	lb.	1.40
122	lb.	1.55
552	lb.	2.50
Aerosol	lb.	.45
Antox, dispersed	lb.	.42
Aquarex A	lb.	.35
D	lb.	.75
F	lb.	.85
WA Paste	lb.	.25
Areskap No. 50	lb.	.18 / .24
100, dry	lb.	.39 / .51
Aresket No. 240	lb.	.16 / .22
300, dry	lb.	.42 / .50
Aresklene No. 375	lb.	.35 / .50
400, dry	lb.	.51 / .65
Black No. 25, dispersed	lb.	.22 / .40
Catalpo	ton	
Collocarb	lb.	.055 / .07
Color Pastes, dispersed	lb.	.35 / 1.90
Dispersex No. 15	lb.	.11 / .12
No. 20	lb.	.08 / .10
Emo, brown	lb.	.15
white	lb.	.15
Factice Compound, dispersed	lb.	.36
Heliozone, dispersed	lb.	.25
Igepon A	lb.	
MICRONEX, Colloidal	lb.	.055 / .07
Nekal BX (dry)	lb.	
Palmol	lb.	.11
Pipsol X	lb.	3.05 / 3.55
R-2 Crystals	lb.	2.50 / 2.75
R-23	lb.	.40
R-N-2	lb.	1.40 / 1.80
Crystals	lb.	2.00 / 2.25
S.1 (400 lb. drums)	lb.	.65
Santomerse D	lb.	.41 / .65
S	lb.	.11 / .25
No. 1	lb.	.18 / .35
No. 2	lb.	.18 / .35
No. 3	lb.	.40 / .65
No. 3P	lb.	.29 / .45
Santovar A	lb.	1.15 / 1.40
Stablex A	lb.	.90 / 1.10
B	lb.	.65 / .90
C	lb.	.40 / .50
Sulphur, dispersed	lb.	.10 / .15
No. 2	lb.	.075 / .15
T.1. (400 lb. drums)	lb.	.40
Tepidone	lb.	1.45
Vulcan Colors	lb.	
Zinc oxide, dispersed	lb.	.12 / .15

Mineral Rubber

Black Diamond	ton	25.00
Hydrocarbon, hard	ton	22.00 /42.00
Parmr	ton	22.00 /24.00
Pioneer	ton	
285°-300°	ton	22.00 /42.00

Mold Lubricants

Mold Paste	lb.	.12 / .18
Sericite	ton	65.00 /75.00
Soapbark	lb.	
Soapstone	ton	25.00 /35.00

Oil Resistant

AXF	lb.	.40 / .50

Reenforcers

Carbon Black		
Aerfloted Arrow Specification Black	lb.	.0275/ .0625
Arrow Compact Granulized Carbon Black	lb.	.0275/ .0625
"Certified" Heavy Compressed, Cabot	lb.	
Spheron	lb.	
Carbitum	ton	58.00/ 63.00
Continental Dustless, c.l.	lb.	$0.0275
Compressed, c.l.	lb.	.0275
Uncompressed, c.l.	lb.	.0275
Disperso, c.l.	lb.	.0275/$0.0375
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0275
c.l., delivered New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
Dixiedensed, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex.	lb.	.0275
c.l., delivered New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
Dixiedensed, 66, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex.	lb.	.0275
c.l., delivered New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
Excello, c.l., f.o.b. Gulf ports	100 lbs.	3.10 / 5.10
delivered New York	100 lbs.	3.75 / 5.75
l.c.l., delivered New York	100 lbs.	6.25 / 7.00
Fumonex, c.l., f.o.b. works	lb.	.03
ex-warehouse	lb.	.05
Gastex	lb.	.03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0275
c.l., delivered New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
Kosmobile 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0275
c.l., delivered New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0275
c.l., delivered New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
MICRONEX Beads, c.l., f.o.b. Gulf ports	lb.	.0275
c.l., delivered, New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
Mark II, c.l., f.o.b. Gulf ports	lb.	.0275
c.l., delivered, New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
Standard, c.l., f.o.b. Gulf ports	lb.	.0275
c.l., delivered, New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
W-5, c.l., f.o.b., Gulf ports	lb.	.0275
c.l., delivered, New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
W-6, c.l., f.o.b., Gulf ports	lb.	.0275
c.l., delivered, New York	lb.	.0375
local stock, bags, delivered	lb.	.0625
Paradene No. 2 (drums)	lb.	.04
Pelletex	lb.	.03 / .07
Supreme, c.l., f.o.b. Gulf ports	100 lbs.	3.10 / 5.10
delivered New York	100 lbs.	3.75 / 5.75
l.c.l., delivered New York	100 lbs.	6.25 / 7.00
"WYEX BLACK"	lb.	.0275/ .0625
Clays		
Aerfloted Paragon (50 lb. bags)	ton	9.50 /22.00
Suprex (50 lb. bags)	ton	9.50 /22.00
China	ton	17.50 /20.00
Crown, f.o.b. (plant)	ton	9.50
Dixie	ton	11.00 /26.00
Junior	ton	9.50 /24.00
Hi-White, f.o.b. Huber Ga.	ton	9.50
McNamee	ton	9.50 /22.00
Par	ton	9.50 /22.00
Witco, f.o.b. works	ton	9.50
P-33	lb.	.0475/ .0775
Thermax	lb.	.0175/ .05
Velvetex	lb.	.022 / .035

Reodorants

Amora A	lb.	
B	lb.	
C	lb.	
D	lb.	
Curodex 19	lb.	2.75
188	lb.	3.50
198	lb.	4.50
Rodo No. 0	lb.	3.50 / 4.00
10	lb.	4.50 / 5.00

(*Continued on page 78*)

COTTON AND FABRICS

New York Quotations

July 24, 1939

Drills

38-inch 2.00-yard ....yd.	$0.11
40-inch 3.47-yard	.07
50-inch 1.52-yard	.15½
52-inch 1.85-yard	.13
52-inch 1.90-yard	.11¾
52-inch 2.70-yard	.11
52-inch 2.50-yard	.09¾
59-inch 1.85-yard	.12

Ducks

38-inch 2.00-yard D.F. ....yd.	.11 /.11½
40-inch 1.45-yard S. F.	.15⅞
51½-inch 1.35-yard D. F.	.16¼
72-inch 1.05 yard D. F.	.20½/.22⅞
72-inch 17.21-ounce	.25¾
Mechanicals	
Hose and belting ....lb.	.25
Tennis	
52-inch 1.35-yard ....yd.	.17¾

Hollands

Gold Seal and Eagle	
20-inch No. 72 ....yd.	.09
30-inch No. 72	.16
40-inch No. 72	.18
Red Seal and Cardinal	
20-inch ....yd.	.07½
30-inch	.13¾
40-inch	.15
50-inch	.24

Osnaburgs

40-inch 2.34-yard ....yd.	.09¾
40-inch 2.48-yard	.09¼
40-inch 2.56-yard	.08
40-inch 3.00-yard	.07⅝
40-inch 7-ounce part waste	.07⅛
40-inch 10-ounce part waste	.10
37-inch 2.42-yard	.09½

Raincoat Fabrics

Cotton	
Bombazine 60 x 64 ....yd.	.07½
Plaids 60 x 48	.10½
Surface prints 60 x 64	.11½
Print cloth, 38½-inch, 60 x 64.	.04⅝
Sheetings, 40-Inch	
48 x 48, 2.50-yard ....yd.	.07¾
64 x 68, 3.15-yard	.06⅞
56 x 60, 3.60-yard	.05⅝
44 x 40, 4.25-yard	.04⅝
Sheetings, 36-Inch	
48 x 48, 5.00-yard ....yd.	.04¼
44 x 40, 6.15-yard	.03½

Tire Fabrics

Builder	
17¼ ounce 60″ 23/11 ply Karded peeler ....lb.	.28
Chafer	
14 ounce 60″ 20/8 ply Karded peeler ....lb.	.28
9¼ ounce 60″ 10/2 ply Karded peeler ....lb.	.27
Cord Fabrics	
23/5/3 Karded peeler, 1 1/16″ cotton ....lb.	.28½
15/3/3 Karded peeler, 1 1/16″ cotton ....lb.	.26½
23/5/3 Karded peeler, 1¼″ cotton ....lb.	.34
23/5/3 Combed Egyptian ....lb.	.47½
Leno Breaker	
8¼ ounce and 10¼ ounce 60″ Karded peeler ....lb.	.30

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1937	51,934,040	$10,213,670
1938	26,606,048	4,147,318
1939		
Jan.	3,589,452	599,927
Feb.	3,844,996	657,565
Mar.	4,491,951	731,302
Apr.	2,279,171	360,739
May	6,240,019	1,067,682

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	May 27	June 24	July 1	July 8	July 15	July 22
June	9.20	....	....	....	....	....
July	8.90	9.46	9.35	9.53	8.12	....
Sept.	8.43	8.87	8.73	8.90	8.87	8.72
Dec.	8.09	8.55	8.46	8.63	8.62	8.54
Mar.	7.98	8.35	8.27	8.41	8.37	8.32
May	7.98	8.28	8.21	8.33	8.25	8.23
June	....	....	....	....	....	8.19

THE accompanying table of week-end closing prices on the New York Cotton Exchange shows the week-end change of representative futures covering the past two months.

After a strong opening the cotton market ruled weaker during the latter part of the month. The New York spot middling price closed at 9.75¢ per pound on July 1, rose to a high of 10.02¢ on July 10, and then receded to close at 9.44¢ per pound on July 22. The closing price on July 26 was 9.75¢.

According to the Census Bureau, consumption of all cotton, exclusive of linters, in the United States during June totaled 578,448 bales, against 605,353 in May and 443,043 in June, 1938. For the eleven months of the season through June consumption totaled 6,333,841 bales, against 5,299,525 the corresponding part of the previous season. June cotton exports were 113,634 bales, against 142,577 in May and 175,878 in June last year.

The Department of Agriculture estimated cotton planted as of July 1 at 24,943,000 acres in its first report for the new season. This acreage is the smallest for harvest since 1899.

An export subsidy of 1.5¢ a pound net weight on lint cotton and commensurate payments on exports of cotton goods produced in the United States became effective on July 27. Goods under the export plan will include rubber-coated and rubberized fabrics. While Department of Agriculture officials expressed hope that 6,000,000 bales of cotton would be moved on to foreign markets under the program, trade interests here were not so optimistic, predicting that subsidized exports will be small.

Fabrics

Cotton textiles continued in good demand during July, with confidence growing among cloth producers and distributers. The sheeting market after a quiet period became very active at mid-month, particularly in regard to staple print cloths. With the fall raincoat season starting, large raincoat manufacturers report a substantial increase in business.

The market in general continues strong with price advances covering a broad range. Tire fabrics and hollands were steady at last month's levels. Price advances were registered in all other fabric groups, although the quotations on some constructions remained steady and unchanged, and in two cases prices were easier.

New York Quotations

(*Continued from page 76*)

Rubber Substitutes

Black ....lb.	$0.07 /$0.11
Brown ....lb.	.07 / .095
White ....lb	.0775/ .11
Factice	
Amberex ....lb.	.17
Brown ....lb.	.07 / .10
Fac-Cel B ....lb.	.12
C ....lb.	.12
Neophax A ....lb.	.0925
B ....lb.	.0925
White ....lb.	.08 / .115

Softeners

Bondogen ....lb.	.98 / 1.50
Burgundy pitch ....lb.	.06
Cycline oil ....gal.	.14 / .20
Nuba resinous pitch (drums) Grades No. 1 and No. 2..lb.	.0265
Nubalene Resin ....lb.	.025
Palm oil (Witco), c.l. ....lb.	.0575
Pine tar ....gal.	
Plastogen ....lb.	.0775/ .12
R-19 Resin (drums) ....lb.	.10
R-21 Resin (drums) ....lb.	.10
Reogen ....lb.	.115 / .26
Rosin oil, compounded....gal.	.40
RPA No. 1 ....lb.	.65
2 ....lb.	.65
3 ....lb.	.46
Rubtack ....lb.	.10
Tackol ....lb.	.085 / .18
Tonox ....lb.	.52 / .61
Tonox D ....lb.	.75 / .85
Witco No. 20 ....gal.	.20
X-1 Resinous oil (tank car).lb.	.019

Solvents

Beta-Trichlorethane ......gal.	
Carbon bisulphide ....lb.	
tetrachloride ....lb.	
Industrial 90% benzol (tank car) ....gal.	.16
Skellysolve ....gal.	

Stabilizers for Cure

Laurex, ton lots ....lb.	.105 / .13
Stearex B ....lb.	.10 / .11
Beads ....lb.	.09 / .10
Stearic acid, single pressed.lb.	.10 / .11
Stearite ....100 lbs.	9.00
Zinc stearate ....lb.	.23

Synthetic Rubber

Neoprene Type E..........lb.	.65
G ....lb.	.70
GW ....lb.	.75
H ....lb.	.78
M ....lb.	.65
Latex Type 57 ....lb.	.30

Varnish

Shoe ....gal.	1.45

Vulcanizing Ingredients

Sulphur	
Chloride, drums ....lb.	.035 / .04
Rubber ....100 lbs.	2.65
Telloy ....lb.	1.75
Vandex ....lb.	1.75
(See also Colors—Antimony)	

Waxes

Carnauba, No. 3 chalky....lb.	.37⅝
2 N.C. ....lb.	.39⅞
3 N.C. ....lb.	.37⅝
1 Yellow ....lb.	.4575
2 ....lb.	.4425
Montan, crude ....lb.	.11

Rubber and Canvas Footwear Production Statistics

Thousands of Pairs

	Inventory	Production	Shipments
1937	20,430	74,102	67,191
1938	16,183	50,812	54,942
1939			
Jan.	16,157	4,807	4,778
Feb.	16,582	4,953	4,629
Mar.	17,281	5,897	5,214
Apr.	18,083	5,216	4,414
May	19,055	5,033	4,017

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

U. S. Crude and Waste Rubber Imports for 1939

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1939	Totals 1938	Balata	Miscellaneous	Waste
Jan. ....tons	36,672	1,521	560	56	9	264	39,082	42,135	61	803	328
Feb.	34,185	1,463	239	348	3	252	36,490	43,930	45	685	54
Mar.	36,434	1,885	229	208	4	229	38,989	35,967	33	649	29
Apr.	27,991	784	487	142	1	196	29,601	30,807	65	275	246
May	44,015	2,167	413	761	7	172	47,535	27,410	78	759	151
June	33,956	1,489	318	42	3	139	35,947	26,011	107	680	7
Total 6 mos., 1939 ......tons	213,253	9,309	2,246	1,557	27	1,252	227,644	....	389	3,851	815
Total 6 mos., 1938 ......tons	196,475	5,546	1,774	991	8	1,466	....	206,260	253	4,483	184

Compiled from The Rubber Manufacturers Association, Inc., statistics.

Rims Approved by The Tire & Rim Association, Inc.

Rim Size	6 Mos., 1939 No.	6 Mos., 1939 %	6 Mos., 1938 No.	6 Mos., 1938 %
Drop Center Rims, 16" Diameter and Under				
16x4.00D	21,143	0.3	6,075	0.2
16x4.50D	487	0.0	5,957	0.2
12x2.50C	7,592	0.1	......	...
15x5.50E	151	0.0	......	...
15x3.00D	71,547	1.1	35,344	0.1
15x3.50D	......	...	46	0.0
15x5.00F	55,678	0.8	......	...
15x5.50F	88,511	1.3	43,765	1.5
16x3.50D	148,774	2.3	159,949	6.5
16x4.00E	3,914,715	59.0	1,761,061	59.2
16x4.25E	486,494	7.3	69,723	2.4
16x4.50E	1,225,473	18.5	517,407	17.4
16x5.00F	519,311	7.8	260,981	8.8
16x5.50F	8,171	0.1	58,728	2.0
16x6.00F	9,639	0.1	14,963	0.5
Drop Center Rims, 17" Diameter and Over				
17x3.00D	93	0.0	719	0.0
17x3.25E	608	0.0	3,164	0.1
17x3.62F	5,911	0.1	......	...
17x5.00F	215	0.0	167	0.0
18x2.15B	17,974	0.3	10,626	0.3
18x3.00D	2,398	0.0	1,187	0.0
18x3.25E	3,282	0.0	1,782	0.1
18x3.62F	9,753	0.1	7,076	0.2
18x4.00F	4,024	0.1	......	...
18x4.19F	3,432	0.1	4,879	0.2
19x3.00D	94	0.0	......	...
19x3.25E	3,616	0.1	248	0.0
20x3.25E	2,196	0.0	2,191	0.1
20x3.62F	......	...	1,774	0.0
21x3.00D	313	0.0	962	0.0
21x3.25E	7,056	0.1	3,108	0.1
22x4.50E	3,172	0.0	......	...
Flat Base Passenger Rims				
All Sizes......	5,102	0.1	3,304	0.1
Rims for High Pressure Tires				
All Sizes	149	0.0	232	0.0
Clincher Rims				
All Sizes	651	0.0	......	...
15" Truck Rims				
15x7	2,424	0.1	2,224	0.3
15x8	1,101	0.1	1,628	0.2
17" Truck Rims				
17x5	34,435	2.1	44,195	5.5
17x6	25,060	1.6	21,296	2.6
18" Truck Rims				
18x5	......	...	59	0.0
18x6	213	0.0	48	0.0
18x7	9,943	0.6	10,242	1.2
18x8	6,592	0.4	8,143	1.0
18x9/10	2,498	0.2	1,328	0.2
20" Truck Rims				
20x5	279,320	17.2	143,917	17.9
20x6	691,227	42.5	374,752	46.7
20x7	345,220	21.2	111,201	13.8
20x8	102,400	6.3	29,983	3.7
20x9/10	13,641	0.8	8,902	1.1
20x11	1,200	0.1	2,102	0.3

Rim Size	6 Mos., 1939 No.	6 Mos., 1939 %	6 Mos., 1938 No.	6 Mos., 1938 %
22" Truck Rims				
22x7	310	0.0	130	0.0
22x8	7,003	0.4	4,295	0.5
22x9/10	2,988	0.2	833	0.1
24" Truck Rims				
24x6	4,601	0.3	946	0.1
24x7	2,615	0.2	1,555	0.2
24x8	2,010	0.1	3,224	0.4
24x9/10	5,030	0.3	3,852	0.5
24x11	4,216	0.3	1,882	0.2
Semi-drop-base Rims				
16x4.50E	30,476	1.9	7,223	0.9
16x5.50F	53,352	3.3	20,506	2.5
Tractor and Implement Rims				
12x2.50C	4,326	1.4	......	...
12x3.00D	5,286	2.2	3,452	1.2
13x5.50F	3,871	1.6	......	...
15x3.00D	9,764	4.8	35,605	12.7
16x3.00D	1,270	0.5	1,147	0.4
16x6.00F	......	...	8,996	3.2
18x3.00D	579	0.2	910	0.3
18x5.50F	12,410	5.2	9,276	3.3
20x4.50E	3,076	1.3	2,128	0.8
20x5.00F	......	...	2,262	0.8
20x5.50F	2,909	1.2	7,673	2.7
21x3.00D	672	0.3	675	0.2
22x4.50E	5,487	2.3	1,600	0.6
24x3.00D	10	0.0	13	0.0
28x4.00E	152	0.1	44	0.0
36x3.00D	793	0.3	852	0.3
36x4.00E	87	0.0	......	...
36x4.50E	3,041	1.3	358	0.1
40x3.00D	92	0.0	61	0.0
40x4.50E	184	0.1	......	...
40x5.50F	......	...	27	0.0
44x4.00E	38	0.0	5	0.0
44x4.50E	205	0.1	......	...
24x5.50R	17,487	7.3	18,438	6.5
43x5.50R	......	...	163	0.1
36x5.50R	9,310	3.9	1,914	0.7
40x5.50R	3,673	1.5	6,275	2.2
20x8.00T	1,691	0.7	507	0.2
24x6.00S	4,649	1.9	2,975	1.0
24x8.00T	39,453	16.8	46,414	16.5
28x6.00S	785	0.3	1,160	0.4
28x8.00T	16,064	6.7	24,963	8.7
32x6.00S	88	0.0	......	...
32x8.00T	6,707	2.8	6,099	2.2
36x6.00S	26,528	11.1	32,362	11.5
36x8.00T	45,827	19.1	48,623	17.3
40x6.00S	11,898	5.0	15,592	5.5
40x8.00T	1,036	0.5	447	0.2
42x8.00T	21	0.0	510	0.2
44x8.00T	......	...	91	0.0
Cast Wheels				
10x5.00F	469	35.6	1,275	78.6
10x6.00F	538	40.8	174	11.0
24x15	312	23.6	173	11.0
Airplane Rims				
All Sizes	1,975	0.0	261	0.0
Totals	8,498,363		4,063,384	

Tire Production Statistics

	Pneumatic Casings Inventory	Pneumatic Casings Production	Pneumatic Casings Shipments
1937	10,383,235	53,309,973	53,485,388
1938	8,451,390	40,182,392	42,330,072
1939			
Jan.	8,932,245	4,581,380	4,163,005
Feb.	9,572,553	4,343,513	3,738,696
Mar.	10,108,584	5,137,030	4,582,655
Apr.	9,997,527	4,211,152	4,355,584
May	9,918,759	4,418,072	4,753,403
June	8,803,924	4,837,290	5,733,216

	Pneumatic Casings Original Equipment	Pneumatic Casings Replacement Sales	Pneumatic Casings Export Sales
1937	22,352,601	29,886,326	1,246,461
1938	10,716,130	30,565,008	1,048,934
1939			
Jan.	1,685,190	2,353,822	123,993
Feb.	1,472,356	2,159,901	106,439
Mar.	1,746,999	2,719,450	116,206
Apr.	1,528,637	2,736,155	90,792
May	1,414,798	3,240,936	97,669
June	1,370,317	3,177,572	98,601

	Inner Tubes Inventory	Inner Tubes Production	Inner Tubes Shipments
1937	10,311,745	52,373,330	52,766,728
1938	8,165,696	37,847,656	40,292,614
1939			
Jan.	8,068,700	4,097,759	3,935,652
Feb.	8,414,652	3,680,521	3,334,791
Mar.	8,900,944	4,470,184	4,015,333
Apr.	8,837,313	3,841,308	3,927,033
May	8,839,536	3,847,827	4,154,390
June	7,814,284	4,249,027	5,065,821

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
2652	Manufacturers of rubber gloves.
2653	Manufacturer of rubber tip forms on metal furniture.
2654	Suppliers of talc.
2655	Manufacturers of sole embossing presses.
2656	Information wanted on making tire paints.
2657	Firms near Norfolk, Va., which are equipped for molding or which solicit custom molding.
2658	Manufacturers of rubber slabs, for the repairing trade, with a cement base and protective textile or paper material.
2659	Supplier of liquid rubber suitable for making molds for plaster of Paris objects.
2660	Manufacturers of rubber scalp massagers.
2661	Manufacturers of rubber grinding mills.
2662	Manufacturers of dipping machines.
2663	Suppliers of prepared latex for making transparent articles.
2664	Manufacturers of knives for cutting uncured stock.
2665	Suppliers of Holland cloth.
2666	Information wanted on drying latex by spraying or atomizing.

LOTS OF COURAGE AND LESS ABILITY OFTEN BEAT an abundance of ability and no courage. *The Oak Leaf.*

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.†	Australia	Belgium	Canada	Czecho-Slovakia	France	Germany	Italy	Japan	U.S.S.R.	Rest of the World	Total
1937	592,500	135,900	19,300	15,000	36,100	13,000	60,000	98,200	24,000	62,200	30,400	78,800	1,120,500
1938	406,330	168,283	12,309	11,310	25,696	9,936	58,148	90,200	28,170	46,307	26,219*	80,427	927,215
1939													
Jan.	36,614	7,121	954	898	2,867	1,131	4,694	7,227	2,133	2,553	4,000*	6,658	70,565
Feb.	30.578	8,087	1,785	1,068	1,451	524	5,327	7,569	2,025	3,263	1,000*	7,163	66,526
Mar.	45,286	12,092	1,324	1,242	2,458	883	4,503	8,036	1,525	4,019	2,000*	7,290	86,648
Apr.	31,590	7,129	1,138	855	1,466	597	5,639	8,719	1,926	3,579	2,000*	7,181	69,442

*Estimated. †U. K. figures show gross imports, not net imports. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

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Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

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CHEMIST WITH VARIED PLANT AND LABORATORY EXPERIENCE in compounding, testing, and reclaiming. Also the preparation, analysis, and evaluation of mineral fillers. Address Box No. 10, care of INDIA RUBBER WORLD.

PRODUCTION EXECUTIVE AND DEVELOPMENT ENGINEER, with many years' practical, thorough experience in all phases of soft mechanicals and hard rubber manufacture, desires correspondence with firm in need of such services. Address Box No. 11, care of INDIA RUBBER WORLD.

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(*Advertisements continued on page 83*)

Rubber Questionnaire

First Quarter, 1939*

	Long Tons: Inventory at End of Quarter	Production	Shipments	Consumption
RECLAIMED RUBBER				
Reclaimers solely (5)	5,332	17,899	16,772	......
Manufacturers who also reclaim (17)	5,876	13,553	1,855	13,697
Other manufacturers (104)	4,793	......	......	13,899
Totals	16,001	31,452	18,627	27,596

SCRAP RUBBER	Long Tons: Inventory	Consumption	Due on Contracts
Reclaimers solely (5)	44,938	20,142	10,915
Manufacturers who also reclaim (15)	31,425	16,354	5,964
Other manufacturers (12)	478	......	......
Totals	76,841	36,496	16,879

Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

PRODUCTS	Rubber Consumed Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Tire and Tire Sundries		
All types pneumatic casings (except bicycle, airplane)	70,367	$74,524,000
All types pneumatic tubes (except bicycle, airplane)	9,954	9,207,000
Bicycle tires, including juvenile pneumatics (single tubes, casings, and tubes)	495	903,000
Airplane tires and tubes	55	156,000
Solid and cushion tires for highway transportation	63	96,000
All other solid and cushion tires	62	262,000
Tire sundries and repair materials	1,884	2,633,000
Totals	82,880	$87,781,000
OTHER RUBBER PRODUCTS		
Mechanical rubber goods	9,270	$28,203,000
Boots and shoes	3,875	10,504,000
Insulated wire and cable compounds	1,398	†
Druggists' sundries, medical and surgical rubber goods	1,011	2,387,000
Stationers' rubber goods	471	617,000
Bathing apparel	225	387,000
Miscellaneous rubber sundries	769	1,550,000
Rubber clothing	133	408,000
Automobile fabrics	58	345,000
Other rubberized fabrics	866	2,333,000
Hard rubber goods	712	1,890,000
Heels and soles	3,571	4,494,000
Rubber flooring	224	380,000
Sponge rubber	1,001	1,239,000
Sporting goods, toys, and novelties	608	1,464,000
Totals	24,192	$56,201,000
Grand totals—all products	107,072	$143,982,000

Inventory of Rubber in the United States and Afloat

	Long Tons: Crude Rubber on Hand	Crude Rubber Afloat
Manufacturers	77,142	8,517
Importers and dealers	71,239	44,359
Totals	148,381	52,876

* Number of rubber manufacturers that reported data was 168; crude rubber importers and dealers, 47; reclaimers (solely), 5; total daily average number of employes (reporting manufacturers and reclaimers), 131,272.

It is estimated that the reported grand total crude rubber consumption is 77.2%; grand total sales value, 80%; the grand total crude rubber inventory, 72.1%; afloat figures, unavailable; the reclaimed rubber production, 70.6%; reclaimed consumption, 61.9%; and reclaimed inventory, 72.2% of the total of the entire industry.

† Owing to the difficulty of securing representative sales figures this item has been discontinued.

Compiled from R.M.A. statistics.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Export Opportunities

No.	COMMODITY	CITY AND COUNTRY
*1865	Heels (seconds only) and sporting goods	Manila, Philippine Islands
*1915	Balloons	Thessaloniki, Greece
‡1928	Cements and rubber flakes and chips for making cements	Amsterdam, Netherlands
†1929	Boots	Marcinelle, Belgium
*1931	Druggists' sundries and toys	Sao Paulo, Brazil
*1933	Druggists' sundries, balloons, and toys	Alexandria, Egypt
*1940	Elastic braces and garters	Sydney, Australia
*1941	Pyroxylin and rubber coated fabrics	Montreal, Canada
†1985	Tires and tubes	Singapore, Straits Settlements
*2311	Automobile accessories and parts	Buenos Aires, Argentina
*2312	Airplane accessories	Brussels, Belgium
‡2314	Novelty rubber sundries and novelties and notions	Rio de Janeiro, Brazil
‡2346	Automobile and truck tires	Havre, France
*2367	Surgeons' gloves and liquid latex	Buenos Aires, Argentina
*2368	Bathing shoes	Bogota, Colombia
†2369	Scrap tire casings without fabric	Johannesburg, South Africa
*2373	Druggists' sundries	Habana, Cuba
†2393	Toys and novelties	Paris, France
*2413	Glass and metal molds and dies for rubber goods manufacture	Buenos Aires, Argentina
*2417	Fountain pens	Paris, France
*2438	Truck tires	Santiago, Chile
¶2439	Airplane and automobile accessories	London, England
*2440	Automobile accessories	Batavia, Java
†2480	Rubber reclaiming machinery	Johannesburg, South Africa
¶2490	Druggists', surgical, and household rubber goods; and athletic, sporting, and traveling requisites	Zurich, Switzerland
*2491	Novelties and toys	Toronto, Canada
†2497	Bathing and sports goods, baby pants, elastic hosiery, and gloves	Brussels, Belgium
*2514	Fountain pens	Bombay, India
*2515	Automobile and airplane parts and accessories	Broomhills, England
*2526	Automobile accessories	Mexico City, Mexico
†2560	Druggists' sundries	Premery, France
‡2573	Toys, games, and sport articles	Jerusalem, Palestine
*2576	Erasers	Stockholm, Sweden
‡2590	Waterproof sheeting	Tel-Aviv, Palestine
*2613	Automobile accessories and parts	Cairo, Egypt
†2615	Shoe machinery for making canvas rubber-soled shoes	Ambato, Ecuador
*2621	Battery boxes, nipples, mats, and matting	Melbourne, Australia
*2627	Household and industrial gloves	Stockholm, Sweden
†2641	Single core heavy rubber-insulated welding cable	Johannesburg, South Africa
*2664	Balloons	Rio de Janeiro, Brazil
*2667	Elastic webbing	Rio de Janeiro, Brazil
¶2669	Printers' blankets	Paris, France
*2683	Bathing caps, balloons, toys, druggists' sundries, corsets, and girdles	Alexandria, Egypt
*2710	Airplane, automobile, and motorcycle accessories and parts	Sydney, Australia
*2734	Rubber bands	Rio de Janeiro, Brazil
†2738	Surgical and hospital rubber goods	Mazatlan, Mexico
*2778	Druggists' sundries and surgical goods	Cairo, Egypt
†2779	Balls	Rotterdam, Netherlands
*2786	Automobile accessories, toys, novelties, and sporting goods	Penang, Straits Settlements
*2791	Women's and children's boots, rubber fabrics	Teheran, Iran
‡2797	Sporting goods and skates	Brussels, Belgium
*2799	Sporting goods	London, England
†2802	Fountain pen parts	Forbach, France
†2806	Fountain pens	Singapore, Straits Settlements
†2821	Footwear and other rubber goods	Tel-Aviv, Palestine
†2836	Storage batteries and separators	Alexandria, Egypt
†2839	Storage batteries and repairing equipment and garage and repair-shop equipment and tools	Brussels, Belgium

Import Opportunities

No.	COMMODITY	CITY AND COUNTRY
§427	Rubber	Singapore, Straits Settlements

*Agency. †Purchase. ‡Purchase and agency. ¶Purchase or agency. §Sale.

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Total	Philippines and Oceania	Liberia†	Other Africa	South America	Mexican Guayule	Grand Total
1937	469,900	431,700	70,400	9,800	7,200	13,200	25,900	35,600	43,400	1,107,100	1,600*	2,300	9,100	16.300	3,400	1,139,800
1938	372,046	298,112	49,528	8,459	6,737	9,512	17,792	41,618	59,156	862,960	1,971*	2,929	9,000*	15,337	2,758	894,955
1939																
Jan.	24,393	38,678	7,237	764	1,115	1,604	2,342	2,918	4,739	83.790	220	528	800	1,812	347	87,497
Feb.	29,278	24,996	5,495	947	618	664	1,484	5,606	5.659	74,747	158	435	800	1,187	319	77,646
Mar.	29 298	27,934	3.718	774	619	344	1,177	5,401	4,636	73,901	230	427	800	1,407	274†	77,039
Apr.	29.779	28.341	2.225	881	379	1.678	2,446	2,600	2.581	70.979	135	533	800	1,206	212	73,865
May	29.598	24.388	2,805	1,010	668	558	1,649	2,782	4,552	68,010	200*	250*	800	1,077	250*	70,587

*Estimated. †Guayule rubber imports into U.S.A. and Germany provisional until export figures from Mexico are received. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Classified Advertisements

Continued

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L. ALBERT & SON

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	May, 1939		Five Months Ended May, 1939	
UNMANUFACTURED—*Free*	Quantity	Value	Quantity	Value
Liquid latex (solids) ..... *lb.*	6,240,019	$1,067,682	20,445,589	$3,417,215
Jelutong or pontianak .... *lb.*	1,444,294	161,745	6,539,639	703,360
Balata .... *lb.*	124,445	16,359	459,261	64,587
Gutta percha .... *lb.*	245,081	44,632	1,245,970	188,251
Guayule .... *lb.*	228,700	22,347	2,116,600	182,607
Scrap and reclaimed ..... *lb.*	1,382,472	22,890	4,595,755	90,087
Totals	9,665,011	$1,335,655	35,402,814	$4,646,107
Misc. rubber (above), 1,000 *lbs.*	9,665	$1,335,655	35,403	$4,646,107
Crude rubber ...... 1,000 *lbs.*	96,316	15,041,433	406,982	63,082,067
Totals .... 1,000 *lbs.*	105,981	$16,377,088	442,385	$67,728,174
Chicle, crude .... *lb.*	990,731	$371,285	10,185,038	$3,546,537
MANUFACTURED—*Dutiable*				
Rubber tires .... *no.*	1,447	$7,647	9,253	$42,983
Rubber boots, shoes, and overshoes .... *prs.*	219	306	3,707	1,566
Rubber soled footwear with fabric uppers .... *prs.*	84,314	13,993	312,701	58,350
Golf balls .... *no.*	136,889	14,212	187,745	21,615
Lawn tennis balls .... *no.*	183,828	21,832	746,368	77,134
Other rubber balls ...... *no.*	349,008	13,980	1,495,488	60,726
Other rubber toys .... *lb.*	25,311	3,211	140,195	22,712
Hard rubber combs ...... *no.*	......	......	452,241	33,672
Other manufactures of hard rubber	......	1,821	......	13,055
Friction or insulating tape *lb.*	31,388	3,830	88,484	15,951
Belts, hose, packing, and insulating material	......	119	......	29,058
Druggists' sundries of soft rubber	......	2,426	......	25,664
Inflatable swimming belts, floats, etc. .... *no.*	126,568	9,047	443,433	28,270
Other rubber and gutta percha manufactures ... *lb.*	64,691	14,501	516,198	246,146
Totals	......	$106,925	......	$676,902

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber .... *lb.*	1,111,918	$180,091	5,160,235	$820,790
Balata .... *lb.*	150	83	23,748	6,715
Other rubber, rubber substitutes and scrap .... *lb.*	82,162	4,356	139,355	8,472
Rubber manufactures (including toys)	......	6,822	......	10,734
Totals	......	$191,352	......	$846,711

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed .... *lb.*	2,256,892	$116,067	8,714,225	$441,438
Scrap .... *lb.*	9,553,423	133,645	43,624,428	646,232
Cements .... *gal.*	55,096	60,400	212,734	265,040
Rubberized auto cloth . *sq. yd.*	11,004	4,957	67,593	35,360
Other rubberized piece goods and hospital sheeting .. *sq. yd.*	220,541	83,115	1,166,645	438,324
Boots .... *prs.*	4,398	9,995	39,726	88,521
Shoes .... *prs.*	12,517	7,359	94,555	44,632
Canvas shoes with rubber soles .... *prs.*	69,791	54,488	291,542	193,807
Soles .... *doz. prs.*	3,261	7,862	19,626	39,052
Heels .... *doz. prs.*	39,812	18,899	216,173	111,922
Soling and top lift sheets *lb.*	52,753	12,714	284,667	54,398
Gloves and mittens .. *doz. prs.*	9,739	20,423	40,868	89,529
Water bottles and fountain syringes .... *no.*	18,401	7,568	100,501	35,728
Other druggists' sundries ...	......	50,446	......	256,654
Gum rubber clothing .... *doz.*	19,017	60,919	135,773	304,702
Balloons .... *gross*	29,381	24,601	173,191	127,423
Toys and balls	......	15,118	......	59,646
Bathing caps .... *doz.*	5,295	10,514	29,786	60,098
Bands .... *lb.*	29,030	11,420	109,870	45,486
Erasers .... *lb.*	27,812	12,614	120,559	63,416
Hard rubber goods				
Electrical battery boxes *no.*	8,177	7,112	77,717	57,071
Other electrical .... *lb.*	17,754	5,720	118,140	34,156
Combs, finished ...... *doz.*	23,013	7,465	72,422	35,281
Other hard rubber goods	......	13,036	......	66,621
Tires				
Truck and bus casings *no.*	31,138	559,185	126,071	2,448,492
Other auto casings .... *no.*	56,922	592,889	312,444	3,423,694
Tubes, auto .... *no.*	60,144	99,057	313,326	485,336
Other casings and tubes .. *no.*	22,617	153,934	51,709	374,083
Solid tires for automobiles and motor trucks .... *no.*	78	1,955	1,483	14,552
Other solid tires .... *lb.*	12,173	2,370	78,866	16,074
Tire sundries and repair materials .... *lb.*	223,973	57,274	908,868	265,431
Rubber and friction tape .. *lb.*	40,490	11,921	272,936	78,747
Fan belts for automobiles *lb.*	67,345	38,282	259,597	152,288
Other rubber and balata belts .... *lb.*	226,170	120,873	1,268,880	682,612
Garden hose .... *lb.*	91,794	18,482	407,344	77,522
Other hose and tubing .... *lb.*	454,013	166,944	2,179,849	801,615
Packing .... *lb.*	112,022	47,337	525,584	229,570
Mats, matting, flooring, and tiling .... *lb.*	100,606	15,939	543,445	88,305
Thread .... *lb.*	59,300	53,346	300,107	264,318
Gutta percha manufactures *lb.*	129,057	35,975	656,222	192,283
Other rubber manufactures ..	......	147,999	......	591,221
Totals	......	$2,880,219	......	$13,780,680

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	March, 1939		Twelve Months Ended March, 1939	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Crude rubber, etc .... *lb.*	5,505,582	$824,273	62,599,794	$8,977,451
Gutta percha .... *lb.*	2,800	2,164	17,416	10,509
Rubber, recovered .... *lb.*	1,044,300	48,339	10,137,500	516,953
Rubber, powdered, and gutta percha scrap .... *lb.*	507,000	5,443	5,496,600	85,521
Balata .... *lb.*	2,589	516	24,511	4,994
Rubber substitute .... *lb.*	23,900	5,458	333,100	67,812
Totals	7,086,171	$886,193	78,608,921	$9,663,240
PARTLY MANUFACTURED				
Hard rubber comb blanks ...	......	$846	......	$10,215
Hard rubber, n. o. s ..... *lb.*	2,501	2,441	30,732	19,951
Rubber thread not covered *lb.*	8,295	5,467	49,453	36,006
Totals	10,796	$8,754	80,185	$66,172
MANUFACTURED				
Bathing shoes .... *pairs*	19,801	$3,829	65,848	$14,151
Belting	......	8,916	......	95,794
Hose	......	9,226	......	97,754
Packing	......	6,622	......	54,770
Boots and shoes .... *pairs*	2,112	1,122	23,657	21,626
Canvas shoes with rubber soles .... *pairs*	3,925	1,405	105,902	34,116
Clothing, including waterproofed	......	7,767	......	42,465
Raincoats .... *number*	2,748	8,639	14,286	46,130
Gloves .... *dozen pairs*	786	2,040	5,725	15,204
Hot water bottles	......	622	......	9,428
Liquid rubber compound	......	2,304	......	64,882
Tires, bicycle .... *number*	14,819	6,597	123,894	57,761
Pneumatic .... *number*	1,911	22,703	21,706	247,786
Inner tubes ...... *number*	617	1,535	5,585	14,097
Solid for automobiles and motor trucks .... *number*	11	427	307	12,898
Other solid tires	......	397	......	10,231
Mats and matting	......	4,293	......	55,170
Cement	......	5,349	......	64,322
Golf balls .... *dozens*	3,360	7,283	33,243	71,701
Heels .... *pairs*	5,120	381	52,535	3,093
Other rubber manufactures ..	......	150,163	......	1,343,045
Totals	......	$251,620	......	$2,376,424
Totals, rubber imports ..	......	$1,146,567	......	$12,105,836

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Waste rubber	$9,070	......	$82,980	......
MANUFACTURED				
Belting	$74,106	......	$633,516	......
Canvas shoes with rubber soles	148,338	......	1,032,589	......
Boots and shoes	217,916	......	3,743,684	......
Clothing, including waterproofed	47,489	......	479,668	......
Heels	14,434	......	175,212	......
Hose	15,617	......	242,105	......
Soles	20,290	......	168,969	......
Tires, pneumatic	676,949	......	7,491,930	......
Not otherwise provided for	31	......	150	......
Inner tubes	65,665	......	682,072	......
Other rubber manufactures ..	83,744	$1,691	822,212	$56,816
Totals	$1,364,579	$1,691	$15,472,107	$56,816
Totals, rubber exports ..	$1,373,649	$1,691	$15,555,087	$56,816

Imports by Customs Districts

	May, 1939		May, 1938	
	*Crude Rubber		*Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	14,320,264	$2,295,838	4,329,080	$618,562
New York	66,497,485	10,509,405	38,981,891	5,046,174
Philadelphia	981,342	144,961	1,787,024	215,639
Maryland	2,311,517	336,550	2,369,797	250,083
Mobile	1,567,901	220,397	......	......
New Orleans	7,930,713	1,229,189	9,954,456	1,359,268
Galveston	......	......	123,200	16,779
Los Angeles	8,215,244	1,249,549	4,813,634	695,649
San Francisco	31,044	126,788	755,273	100,447
Oregon	16,800	2,662	40,320	6,044
Ohio	......	......	96,355	11,864
Colorado	112,000	16,123	224,000	30,999
Totals	102,784,310	$16,131,462	63,475,030	$8,351,508

*Crude rubber including latex dry rubber content.

EDISON DIDN'T HAVE A PHONOGRAPH OR AN ELECTRIC LIGHT—FORD DIDN'T have an auto—the Wright brothers didn't have an airplane—Who said you didn't have a chance? *Forbes Magazine.*

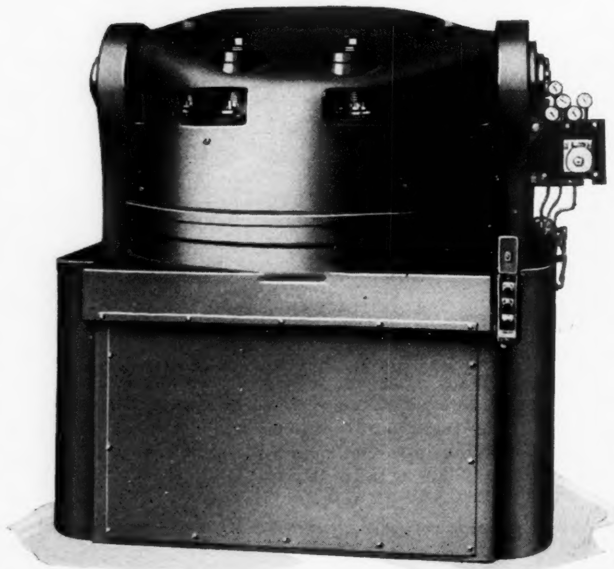
SMOOTH CURE TIRE VULCANIZER

Only four bolts required to fasten your present pot heater molds in this vulcanizer.

Fitted with an automatic tire ejecting device enabling the operator to easily and quickly lift the cured tire from the vulcanizer and replace an uncured tire on the same ring.

Manufactured to handle all size tires.

With our Smooth Cure Tire Vulcanizer you now can obtain steam jacketed mold results and increase production with your present pot vulcanizer molds. This vulcanizer is so constructed that when it is closed, the mold is encased in a steam vessel fully air tight. By connecting a vacuum line to this vessel, all air is ejected both from the vessel and the mold. When pressure is exerted in the airbag and steam turned on in the vessel, a perfect smooth cure is obtained.



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THE AKRON STANDARD MOLD COMPANY

AKRON, OHIO


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for
SPONGE RUBBER
TRIMENE • an old-timer with unique properties and a history of many years successful use in sponge.
MONEX • for short cures, fine pores. for low-sulphur sponge.
PENTEX • a new accelerator with more delayed action.
OXAF • useful alone or in a variety of combinations. This accelerator is a chemical plasticizer of uncured rubber—a highly useful property, and a money saver.
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DIVISION OF UNITED STATES RUBBER COMPANY
1790 BROADWAY
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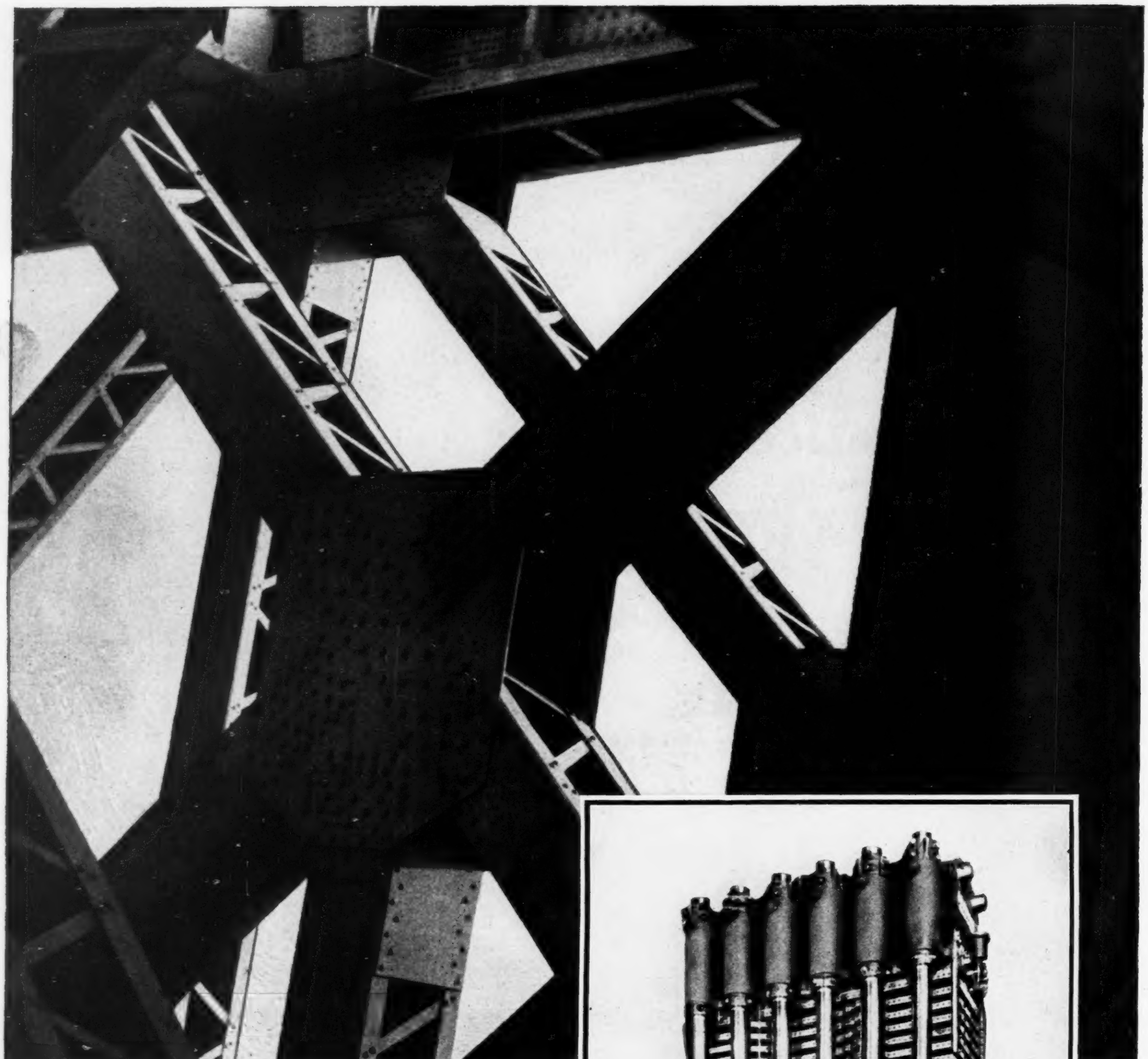

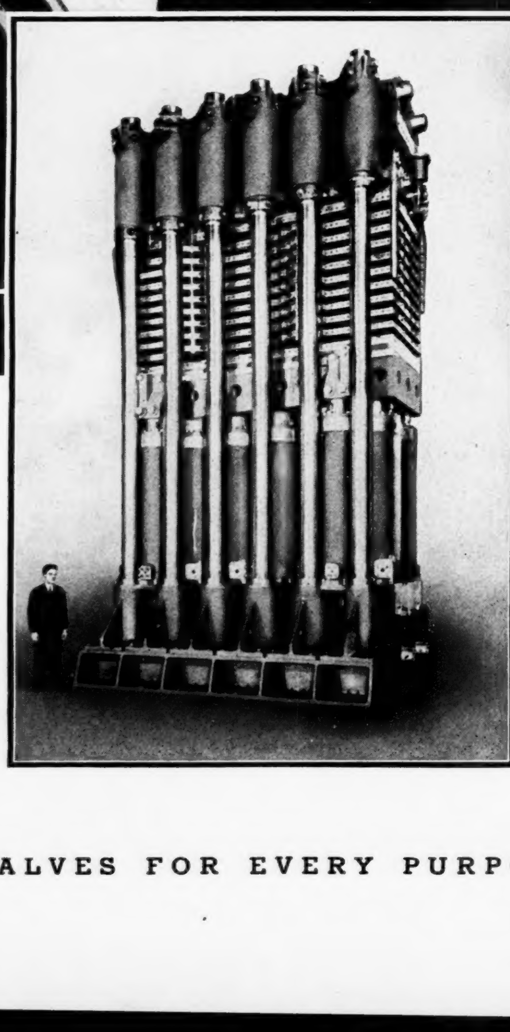

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In R. D. WOOD hydraulic presses, strength is as carefully engineered as in a modern steel bridge. Dependable strength is but one of the many reasons why it will pay you to consult WOOD engineers on your hydraulic press requirements.

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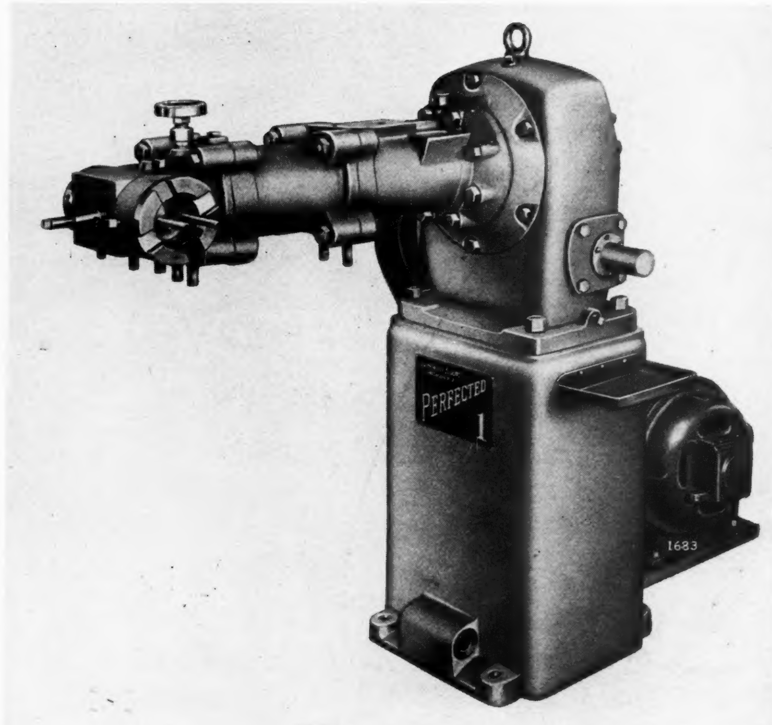

PERFECTED
1
1683

DIXIEDENSED KOSMOBILE

66

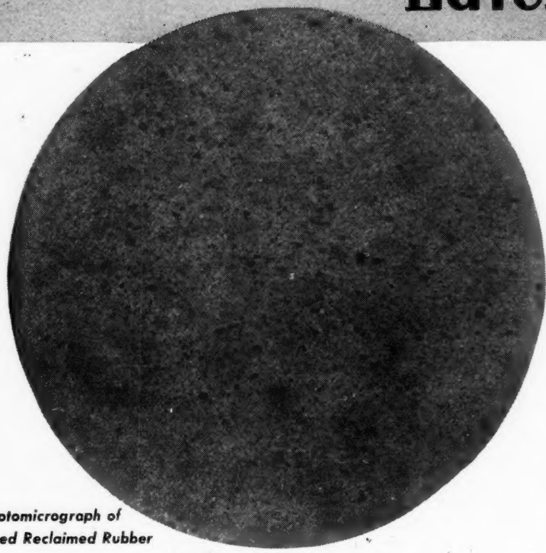
DUSTLESS CARBON BLACKS

UNITED CARBON COMPANY

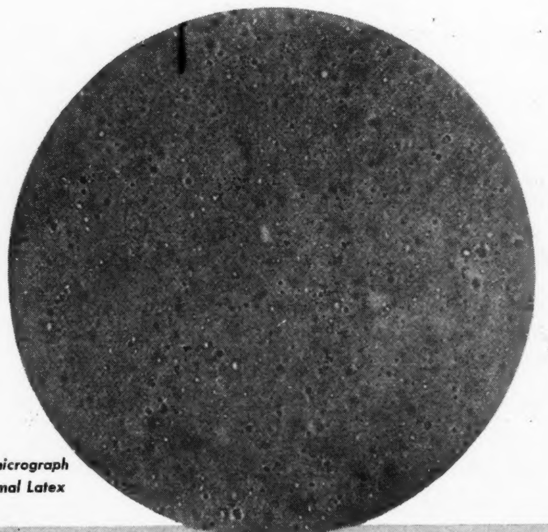
CHARLESTON, WEST VIRGINIA

TWO KINDS OF WATER DISPERSIONS OF RUBBER

Latex • DISPERSITE



Photomicrograph of Dispersed Reclaimed Rubber



Photomicrograph of Normal Latex

DISPERSITE is the trade-marked name for water dispersions of crude or reclaimed rubbers and their compounds (sometimes known as artificial latices) made under the original Pratt patents.

DISPERSITES have been extremely successful in:

CEMENTS & ADHESIVES	CARPET & FELT SIZINGS
PLASTICIZING	BONDING
COATINGS	EXTENDING LATEX
IMPREGNATING	REDUCING COSTS

DISPERSITE as shown in the photomicrograph has a particle size of approximately the same order as that of latex.

DISPERSITES do not have ammoniacal odor.

DISPERSITE solids made from reclaim are frequently better ageing and more heat resistant than solids deposited from rubber latex.

DISPERSITES with curing ingredients added can be obtained at a very small advance in price over the non-curing types.

DISPERSITE made from reclaimed rubber is low in price.

DISPERSITE made from reclaim has a price structure which is much more stable and economically sound than that of rubber. In just the last four years, 1935 through 1938, while rubber has been fluctuating in price more than 16¢ per pound, from 10⅜¢ to 27⅛¢, DISPERSITE, made from reclaim, has varied but ½¢ per pound.

DISPERSITE made from reclaim draws on a source of raw material supply in the United States which is almost unlimited. In the event of international situations that would cut off supplies of crude rubber, DISPERSITES would still be available.

DISPERSITE technicians are available for consultation on your problem.

Dispersions Process, Inc.

1790 Broadway, DP Inc. New York, N.Y.

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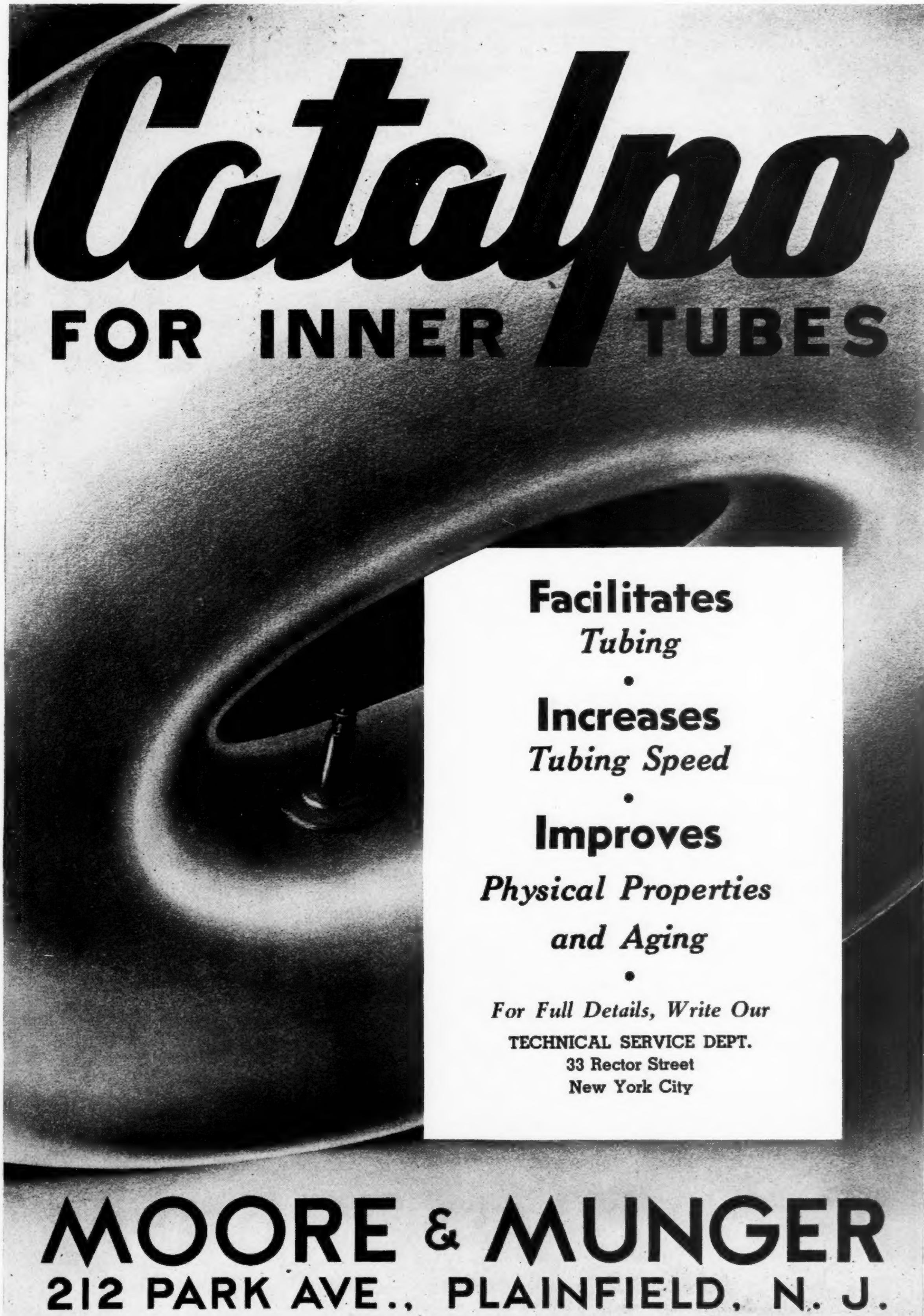
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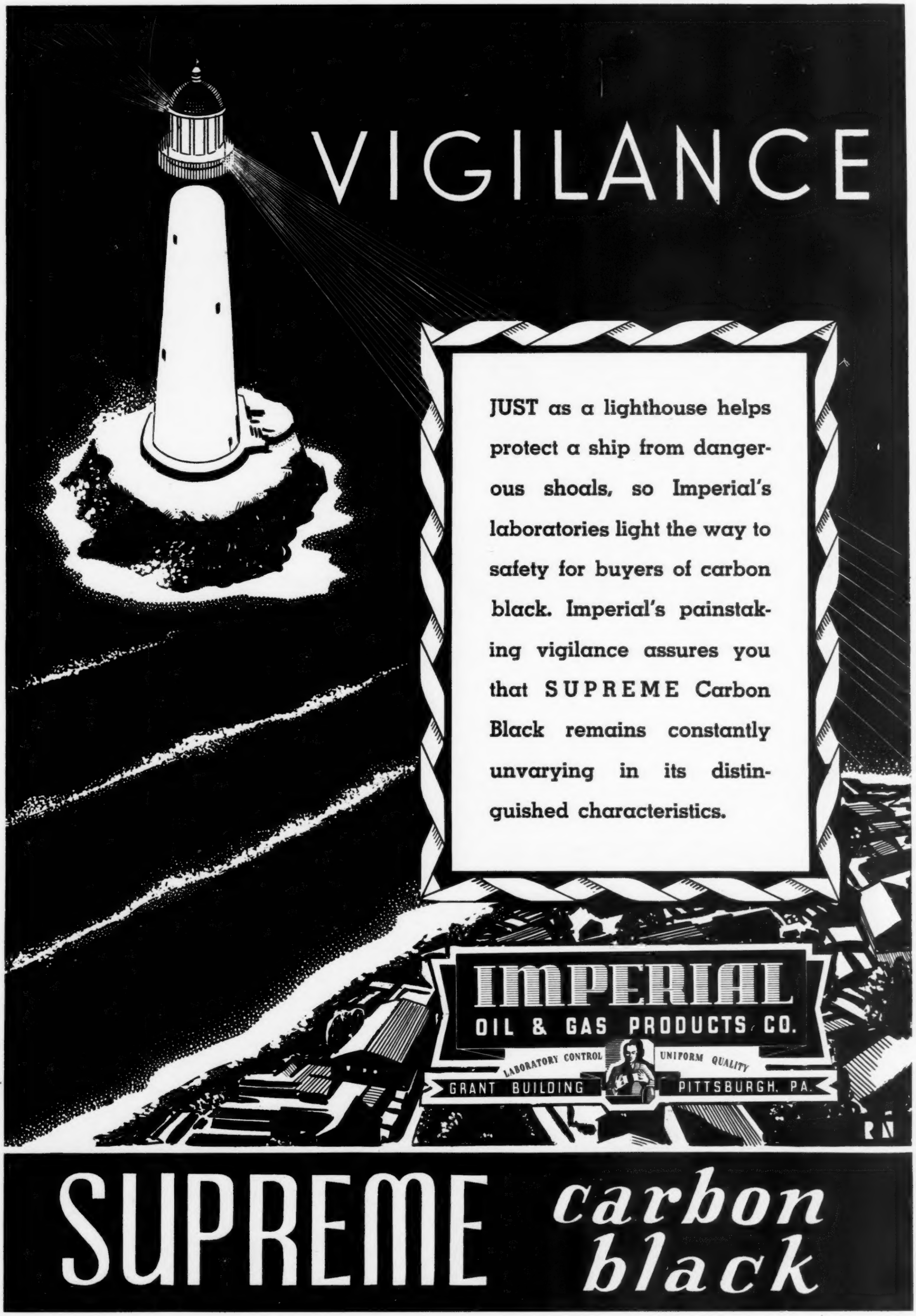
VIGILANCE
JUST as a lighthouse helps protect a ship from dangerous shoals, so Imperial's laboratories light the way to safety for buyers of carbon black. Imperial's painstaking vigilance assures you that SUPREME Carbon Black remains constantly unvarying in its distinguished characteristics.
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SUPREME carbon black

STRAIGHT, PLACE and SHOW!

THREE TITANOX pigments now cover together the entire range of white and tinted rubber compounding. That the industry has adopted them widely testifies that they give a degree of whiteness and brightness never before attainable. Thus a product which a few years ago was considered a chemical curiosity, has risen to dominance in the coloring of white and pastel-shade rubber compounds.

Constant improvement in manufacturing technique has permitted notable reductions in price to the point where TITANOX pigments give the largest value obtainable in opacity, whiteness and stability.

Much has been learned of these titanium-derived pigments since their introduction, and not of least importance is that they definitely impart desirable physical properties to rubber.

If you have color problems, we wish to help you. For your assistance we maintain a well equipped service laboratory to serve the rubber industry.

3 MODERN PIGMENTS FOR WHITENING RUBBER

TITANOX-A
(Titanium Dioxide)
for light weight products — gives maximum whiteness and brightness with low pigmentation.

TITANOX-C
(Titanium Calcium Pigment)
where greater loading is permissible — gives lower unit cost because of low specific gravity and high tinting strength.

TITANOX-M
(Titanium Magnesium Pigment)
where heavy pigment loading is desirable — gives stiffer stocks and has nice processing qualities at low volume cost.

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